US AIR FORCE
INSTALLATION RESTORATION PROGRAM
KEESLER AIR FORCE BASE, MISSISSIPPI

FINAL REMEDIAL DESIGN FOR LANDFILL 3 (SWMU 9)
TECHNICAL SPECIFICATIONS

EPA I.D. NO. MS2 570 024 164

AIR FORCE CENTER FOR ENVIRONMENTAL EXCELLENCE
BROOKS AFB, TEXAS

DECEMBER 2001

CONTRACT F41624-00-D8024
TASK ORDER 0001

December 20, 2001

Mr. Rodney Arnold
AFCEE/ERD
3207 North Road
Brooks AFB, TX 78235-5363

Subject: Contract No. F41624-00-D-8024, Delivery Order 0001, Final Design Submittal for Landfill 3 (SWMU 9) at Keesler AFB, MS

Dear Mr. Arnold:

Enclosed please find the CD-ROM containing the technical specifications and drawings for the Final Remedial Design of Landfill 3 (SWMU 9) at Keesler AFB. Parsons Engineering Science, Inc. is also submitting a hard copy of the Final Remedial Design to the personnel listed at the bottom of the page.

Should you have any questions or comments regarding this submittal, please contact me at (678) 969-2375.

Sincerely,

Parsons Engineering Science, Inc.

Jimmy Duncan, P.G.
Project Manager

Enclosures

c: Rob Pope, USEPA (2)
Bob Merrill, MDEQ (1)
Lisa Noble, KAFB (4)
Jack Sullivan, Parsons ES, San Antonio (1)
AFCEE/MS (cover letter)
HSW/PKVAB (cover letter)

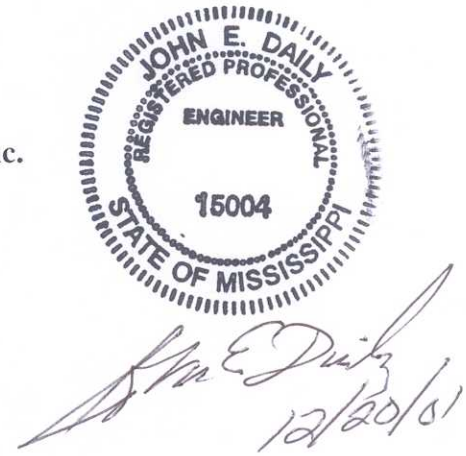
FINAL REMEDIAL DESIGN FOR LANDFILL 3 (SWMU 9)
TECHNICAL SPECIFICATIONS

KEESLER AIR FORCE BASE, MISSISSIPPI
EPA I.D. NO. MS2 570 024 164

Prepared for
Air Force Center for Environmental Excellence
Brooks AFB, Texas

CONTRACT F41624-00-D8024
TASK ORDER 0001

Prepared by
Parsons Engineering Science, Inc.
Atlanta, Georgia



December 2001

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REMEDIAL DESIGN FOR LANDFILL 3 (SWMU 9)
KEESLER AFB, MS

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CONTRACT DOCUMENTS

SECTION 00300

BID FORM

The undersigned hereby proposes to perform all work for which a contract may be awarded to him and to furnish any and all labor, services, project plans, material, tools, equipment, supplies, transportation, utilities, and all other items and facilities necessary therefor, to do everything required therein for the performance of all construction and remedial activities required in the Contract Documents at the Landfill 3, Keesler Air Force Base, Mississippi. The undersigned further proposes and agrees that, if this Bid is accepted, it will contract in the form and manner stipulated to perform all the Work in accordance with the Contract Documents, and to complete all such Work in strict conformity therewith within the time set forth therein, and that it will accept as full payment therefor the prices set forth in the Bid Schedules forming a part hereof. Bid Schedules shall include the following:

Schedule A - Schedule of Prices

Schedule B - List of Subcontractors

A Bank Cashier's check or Bid Bond properly made payable to United States Air Force, for the sum of _____ _____ Dollars ($_____), which amount is not less than (5) percent of the total amount of this Bid, is attached hereto and is given as a guarantee that the undersigned will execute the Agreement and furnish the required bonds and proof of insurance if awarded the Contract. Surety's liability to the United States Air Force for forfeiture of the face amount of the Bond shall be considered as established.

It is understood and agreed that:

1. The undersigned has carefully examined all the documents which will form a part of the Contract and all additions, deletions, modifications, and appendices and all addenda as prepared prior to the date of bid opening setting forth any modifications or interpretations of any of said documents;
2. The undersigned has by investigation of the Site of the Work, and otherwise, satisfied itself as to the nature and location of the Work and has fully informed itself as to all conditions present or possibly present at the Site and matters which can in any way affect the Work or the cost thereof;
3. The undersigned fully understands the scope of the Work and has checked carefully all words and figures inserted in this Bid and it further understands that the Owner will in no way be responsible for any errors or omissions in the preparation of this Bid;
4. The undersigned shall execute the Agreement required Construction Performance and Payment Bonds within twenty (20) calendar days after Notice of Award and shall furnish the proof of Insurance coverage prior to executing the Agreement and shall furnish the Bonds with executed Agreement; and further, that this bid may not be withdrawn for a period of sixty (60) calendar days after the date set for the opening thereof, unless otherwise required by law. If any Bidder withdraws its Bid within said period, the Bidder shall be liable under the provisions of the Bid Security, or the Bidder and his surety shall be liable under the Bid Bond, as the case may be. The Bid Security will be returned after the Successful Bidder has executed the Agreement and filed satisfactory bonds and proof of Insurance coverage;
5. The undersigned Bidder further agrees that if it should fail to complete the Work within the Period of Performance and any authorized extension thereof, it shall pay liquidated damages in the amount of $1,500 for each calendar day of unauthorized delay in completion of the Work until the Work is completed;

6. The undersigned hereby certifies that this proposal is genuine and not sham or collusive or made in the interest or in behalf of any persons not herein named, and the undersigned has not directly or indirectly induced or solicited any other Bidder to put in a sham Bid, or any other person, firm or corporation to refrain from bidding; the undersigned has not in any manner sought by collusion to secure for itself an advantage over any other bidder. It is further understood and agreed that the aggregate total of all subcontracts for on-site work shall not exceed 45 percent of the total contract price;
7. The undersigned Bidder has set forth in Schedule B the name and the location of the place of business of each Subcontractor who will perform Work or labor or render service to the Bidder in or about the Work to be performed under the documents to which this Bid is responsive, and where the portion of the Work which will be done by each Subcontractor for each subcontract is in excess of $20,000; and
8. Receipt is hereby acknowledged of addenda number(s) _____ through _____

In compliance with the Bid Documents and all the provisions hereinbefore stipulated, the undersigned, with full cognizance thereof, hereby proposes to perform the entire Work for the prices set forth in the attached Schedules upon which award of Contract is made.

Contractor Name: _____

Business Address: _____

_____

By: _____
Contractor Signature

Partnership Name: _____

Business Address: _____

_____

By: _____
Partner Signature

Other Partners: _____

_____

Corporation Name: _____

Business Address: _____

_____

By: _____
President Signature

ATTEST:

Organized under the laws of the State of _____

Date: _____ By: _____
Notary Signature with Seal

END OF SECTION 00300

Schedule A.1
Schedule of Prices
Remedial Action for Landfill 3 (SWMU 9)
Keesler Air Force Base, Mississippi

Bid Item	Estimated Quantity	Unit	Unit Price	Total Price
1. Pre-Construction Activities				
A. Pre-Construction Conference	1	L.S.	N/A	$_____
B. Preparation of Plans	1	L.S.	N/A	$_____
2. Mobilization	1	L.S.	N/A	$_____
3. Demolition	1	L.S.	N/A	$_____
4. Site Clearing	1	L.S.	N/A	$_____
5. Initial Site Preparation				
A. Utilities	1	L.S.	N/A	$_____
B. Fencing and Security	1	L.S.	N/A	$_____
C. Sedimentation and Erosion Controls	1	L.S.	N/A	$_____
D. Site Access Roadway Construction	1	L.S.	N/A	$_____
E. Support Areas	1	L.S.	N/A	$_____
6. Storm Drain Pipe Construction	1	L.S.	N/A	$_____
7. Water Management				
A. Water Disposal Without Treatment	1	L.S.	N/A	$_____
B. Water Disposal With Treatment				
1. Up to 50,000 Gallons	50,000	Gallon	$_____	$_____
2. Greater than 50,000 Gallons		Gallon	$_____	
8. Waste Loading, Transportation, and Disposal				
A. Asphalt Cart Path Demolition Waste	1	L.S.	N/A	$_____
B. Waste Disposal at Landfill				
1. Up to 200 Tons	200	Ton	$_____	$_____
2. Greater than 200 Tons		Ton	$_____	
9. Subgrade Fill Placement	1	L.S.	N/A	$_____
10. Methane Collection System				
A. Gas Collection Trench Installation	1	L.S.	N/A	$_____
B. Geonet Placement	1	L.S.	N/A	$_____
C. Geonet Protection Layer	1	L.S.	N/A	$_____
D. Methane Vent Standpipe Installation	1	L.S.	N/A	$_____
11. Geosynthetic Clay Liner (GCL) Layer				
A. GCL Placement	1	L.S.	N/A	$_____
B. Barrier Protection Layer	1	L.S.	N/A	$_____
12. Irrigation System	1	L.S.	N/A	$_____

Schedule A.1
Schedule of Prices
Remedial Action for Landfill 3 (SWMU 9)
Keesler Air Force Base, Mississippi

Bid Item	Estimated Quantity	Unit	Unit Price	Total Price
13. Golf Course Landscaping and Related Structures				
A. Cart Path Construction	1	L.S.	N/A	$_____
B. Landscaping	1	L.S.	N/A	$_____
14. Monitoring Well Installation	8	Each	$_____	$_____
15. Demobilization	1	L.S.	N/A	$_____
Total Bid Price				$_____

Notes:
L.S. - Lump Sum
SY - Square Yard
N/A - Not Applicable

Name and Location of Construction/Demolition Landfill Identified:

Name and Location of Wastewater Disposal Facility Identified:

Name and Location of Off-site Source For Backfill:

Schedule A.2
Listing of Labor and Equipment Rates
Remedial Action for Landfill 3 (SWMU 9)
Keesler Air Force Base, Mississippi

Bid Item No.___ **Bid Item_____**

Labor Category	Quantity	Unit	Unit Cost	Total Cost
Project Manager				
Site Manager				
Engineer				
Health and Safety Officer				
Operator				
Laborer				
Other Classifications (list below)				

Schedule A.2 - (Continued)
Listing of Labor and Equipment Rates
Remedial Action for Landfill 3 (SWMU 9)
Keesler Air Force Base, Mississippi

Bid Item No.___ **Bid Item_____**

Equipment Category	Quantity	Unit	Unit Cost	Total Cost
Trackhoe				
Dozer				
Front-end Loader				
Backhoe				
Pump (Type_____)				
Generator (Type_____)				
High Pressure Sprayer				
Passenger Truck				
Equipment Truck				
Water Truck				
Storage Tank (_____gal.)				
Chain Saw				
Dump Truck (____ CY)				
Drum Handling Equipment				
Other Equipment (list below)				

Schedule A.3
Listing of Material Rates
Remedial Action for Landfill 3 (SWMU 9)
Keesler Air Force Base, Mississippi

Bid Item No.___ **Bid Item_____**

Item Description	Quantity	Unit	Unit Cost	Contractor Markup, %	Total Material Cost, $

Schedule B
List of Subcontractors
Remedial Action for Landfill 3 (SWMU 9)
Keesler Air Force Base, Mississippi

Name of the Subcontractor	Address of the Subcontractor	Description of Subcontract	Value of Subcontract ($)

DIVISION 1

GENERAL REQUIRMENTS

SECTION 01010

SUMMARY OF WORK

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. This section provides a summary of the Work to be conducted at Landfill 3 (Site) located at Keesler Air Force Base (AFB) in Biloxi, Mississippi. The Owner reserves the right to contract separately any of the work items described in this section. Work items described herein are stated in the Specifications and/or are shown on the Drawings.

B. The work includes providing all facilities, plans, equipment, materials, and labor to satisfactorily construct and perform all specified items. The following general summary does not limit the work to be less than that required under these specifications.

1.02 ORGANIZATION AND INTERPRETATION OF THE CONTRACT DOCUMENTS

A. Specifications and Drawings establish performance and quality requirements, location and general arrangement of materials and equipment, and minimum standards for quality of workmanship and appearance.

B. Specification sections have not been divided into groups that separate the work of Subcontractors or various trades. Should there be questions concerning the applicability or interpretation of a particular section or part of a section or Drawing, direct questions in writing to the Owner or Owner's Representative.

C. Work shown on the Drawings is intended to be descriptive and may not be an exact and complete representation of the actual finished work.

D. Any work that is necessary or required to make each installation complete and operable for its intended purpose, even though it is not specifically included in the Specifications or on the Drawings, shall be performed as incidental work as if it were described in the Specifications and shown on the Drawings.

1.03 WORK BY OTHERS

A. The Contractor shall employ the services of an Independent Testing Laboratory (ITL) to conduct all quality assurance. testing required by the Owner-approved Construction Quality Assurance/Quality Control (QA/QC) Plan as specified in Section 01402 – CONSTRUCTION QUALITY ASSURANCE/QUALITY CONTROL PLAN. The results reported by the ITL shall be final in determining the compliance or completeness of the Work in accordance with the requirements established in the Contract Documents.

B. The Owner will contract separately for developing the Construction QA/QC Plan. The Construction QA/QC Plan shall provide the testing and documentation procedures necessary to ensure, with a reasonable degree of certainty, that the construction of Landfill 3 cover is performed in accordance with the design criteria, plans and specifications, and the performance standards.

C. The Owner may contract separately for providing construction oversight services for the work performed by the Contractor.

1.04 DESCRIPTION OF WORK

A. General: The Work is the construction of the Landfill 3 cover, and the specified project tasks include the following:

1. Preconstruction Activities
2. Mobilization
3. Demolition
4. Site Clearing
5. Initial Site Preparation
6. Storm Drain Pipe Construction
7. Water Management
8. Waste Loading, Transportation, and Disposal
9. Subgrade Fill Placement
10. Methane Collection System
11. Geosynthetic Clay Liner Layer
12. Irrigation System
13. Golf Course Landscaping and Related Structures
14. Monitoring Well Installation
15. Demobilization

B. Specific:

1. **Preconstruction Activities**
   a. The Contractor shall attend a preconstruction conference at Keesler AFB, Mississippi, as described in Section 01200 - PROJECT MEETINGS.
   b. The Contractor shall prepare the required project plans and submittals including the following support plans.
      (i)) Site Operation Plan (SOP) in accordance with the Section 01300 – SUBMITTALS.
      (ii) Contractor's Construction Health and Safety Plan (CHSP) in accordance with the Section 1065 – HEALTH, SAFETY, AND EMERGENCY RESPONSE REQUIREMENTS.
      (iii) Other plans and submittals as specified in Section 01300 - SUBMITTALS.
   c. The Contractor shall obtain all necessary approvals, permits, and consents to start and execute the Work.

2. **Mobilization**

   The Contractor shall move personnel, equipment, materials and all other items necessary to prepare the Site for the Work and to complete the Work on site. The Contractor shall decontaminate all construction equipment prior to mobilization on the Site.

3. **Demolition**

   The Contractor shall demolish existing structures as indicated on the Drawings prior to site clearing and grubbing; and installation of construction facilities and temporary controls. The Contractor shall conduct demolition activities according to the specification Section 02110 – DEMOLITION.

4. **Site Clearing**

   The Contractor shall conduct site clearing activities in accordance with Section 02150-CLEARING AND GRUBBING. The Contractor shall clear Site areas as shown on the Drawings. The Contractor shall complete site clearing activities prior to the installation of construction facilities and temporary controls. The Contractor shall place sedimentation and erosion controls downgradient of disturbed areas per Section 02270-SEDIMENT AND EROSION CONTROL.

   The Contractor shall comply with all applicable local, state, and federal regulations, guidances, and policies for the disposal of clearing debris. The resultant trees, brush, and vegetation shall be disposed of at an off-site solid waste landfill.

5. **Initial Site Preparation**

   The Contractor shall perform the following site preparation activities prior to the construction activities.

   a. Utilities. Water and electric utilities are available at the Site for no cost to the Contractor. The Contractor shall be responsible for extending these utilities to temporary facilities and its equipment. The Contractor shall also be responsible for providing other construction utilities as required and as specified in Section 01500 – CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS.

   b. Fencing and Security. The Contractor shall install construction fencing at the Site to warn the unauthorized personnel and trespassers of construction activities on-going at the Site throughout the duration of the Work. The Contractor shall be responsible for security of the Site including materials, instruments, equipment and all other items located at the Site until the Owner accepts the completed Work. The fencing and security of the Site shall be in accordance with the specifications, Section 01500 – CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS.

   c. Sedimentation and Erosion Controls. The Contractor shall install silt fencing, hay bales, turbidity curtains, and other appropriate sedimentation and erosion controls downgradient of cleared, grubbed, or other disturbed areas. These sedimentation and erosion controls shall be installed according to specification, Section 02270-SEDIMENT AND EROSION CONTROL. Throughout Landfill 3 cover implementation activities, the Contractor shall add, remove, and maintain erosion controls as required in the sedimentation and erosion controls specification.

d. Site Access Roadway Construction. The Contractor shall construct access roadways throughout the Site that are necessary to conduct the Work. The construction of access roadways shall be in accordance with the Section 01500 – CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS. The Contractor shall be responsible for maintenance of the access roadways on the Site throughout the duration of the Work.

e. Support Areas. Prior to initiating construction work, the Contractor shall set-up office trailers and operational facilities. The Contractor shall furnish and set-up a total of two (2) field office trailers: one for the Owner and Owner's Representative and one for the Contractor. All office trailers shall include heating and air conditioning, lighting, and water. The office trailers shall be located and set-up in the operations area as shown on the Drawings. The Contractor shall install a 6-feet high temporary fence with a lockable gate around the operational area as shown on the Drawing. The Contractor shall locate and set-up the office trailers and operational facilities according to the specifications, Section 01500 – CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS.

6. **Storm Drain Pipe Construction**

The Contractor shall furnish, install and construct storm drains, including but not limited to, concrete pipes, manholes, junction boxes, fittings, drop inlets, and outfall structures. The construction of the storm drain pipe shall be in accordance with the specifications, Section 02720 – STORM DRAINAGE SYSTEM.

7. **Water Management**

The Contractor shall be responsible for disposing the water that may be generated during the construction of the storm drain and Landfill 3 cover. The disposal of the construction water shall be accomplished by pumping the water into Back Bay. The Contractor shall be responsible for meeting the water quality criteria, if any, for the disposal of the water into the Back Bay.

8. **Waste Loading, Transportation, and Disposal**

The Contractor shall accumulate, load, transport, and dispose of wastes generated during the Work, including but not limited to the following:

a. Waste from demolition activities with exception of the asphalt cart path (see Section 02110 - DEMOLITION and Section 02200 - EARTHWORK);

b. Other materials generated during the performance of the Work and designated as waste by the Owner's Representative.

The Contractor shall transport waste material off-site to appropriate disposal facilities. The materials may be transported in semi-transports or by other applicable means that comply with local, state, and federal requirements. For all truck traffic to and from the Site, the Contractor shall strictly follow a truck route proposed by the Contractor and approved by the Owner.

The Contractor shall be responsible for obtaining and maintaining the Department of Transportation (DOT)-approved containers, certification for transports, certification that the driver is fit and trained, driver's current log book and a valid certification of insurance for the transport.

The Owner shall prepare and sign manifests for waste shipments. The Contractor shall decontaminate loaded vehicles leaving the Site as so no material or soil is tracked on to any off-site roadway. The off-site transportation activities shall be conducted according to the specifications, Section 01620 - OFF-SITE TRANSPORTATION.

The Contractor shall dispose of transported waste at a designated location. The Contractor shall complete manifests that are originated at the Site, at the disposal location and shall return to the Owner's Representative for tracking. The data from the completed manifest copy will include, but may not be limited to, shipment date, manifest number, truck number, shipment weight, contents, and destination.

9. **Subgrade Fill Placement**

   The Contractor shall place subgrade fill over the existing Site surface in accordance with Section 02200 – EARTHWORK, Section 02260 – LANDFILL COVER CONSTRUCTION, and Section 02700 – SITE DRAINAGE. The Contractor shall place, compact, and grade the subgrade fill material to alignment and elevations shown on the Drawings.

   Upon completion of the subgrade fill placement, the Contractor shall obtain services of a Registered Land Surveyor to survey the Site for determining the grades and elevations of the subgrade fill layer. Costs for surveying will be paid by the Contractor. The Contractor shall bear the cost of repeating a survey if the subgrade fill layer fails to confirm to the grades and elevations shown on the Drawings.

10. **Methane Collection System**

    The Contractor shall construct the methane collection system as shown on the Drawings. The methane collection system shall include placement of geonet over the subgrade fill; installation of collection trench; placement of perforated gas vent pipe and fittings; installation of methane vent pipe riser and fittings; and placement of a geonet protection layer. The Contractor shall furnish and install a methane collection system in accordance with Section 02200 – EARTHWORK, Section 02260 – LANDFILL COVER CONSTRUCTION, Section 02280 – GEOSYNTHETICS, Section 02422 – GEONET, and Section 02700 – SITE DRAINAGE. The Contractor shall place, compact, and grade the geonet protection layer to the alignment and elevations shown on the Drawings.

11. **Geosynthetic Clay Liner (GCL) Layer**

    The Contractor shall furnish and install the GCL layer as shown on the Drawings. The GCL layer shall include placement of the GCL and the barrier protection layer. The Contractor shall furnish and install the GCL layer in accordance with Section 02200 – EARTHWORK, Section 02260 – LANDFILL COVER CONSTRUCTION, Section 02281 – GEOSYNTHETIC CLAY LINER, and Section 02700 – SITE DRAINAGE. The Contractor shall place, compact, and grade the barrier protection layer to the alignment and elevations shown on the Drawings.

12. **Irrigation System**

    The Contractor shall furnish and install the irrigation system on the Site in accordance with Section 02810 - IRRIGATION SYSTEM and as shown on the Drawings.

13. **Golf Course Landscaping and Related Structures**

    The Contractor shall landscape all areas and replace/relocate existing structures at the Site disturbed during performance of the Work in accordance with Section 02821 – LANDSCAPING and Section 02600 – ASPHALT PAVING AND SURFACING and as shown on the Drawings. The disturbed areas shall include those areas within the limits of the grading areas, specifically those areas that have been excavated, backfilled, filled, graded, and which have exposed soil. The Contractor shall seed and tend, as necessary, with mulch, fertilizer, water, etc., to establish a stand of grass over the disturbed areas.

14. **Monitoring Well Installation**

    The Contractor shall install monitoring wells at the Site in accordance with Section 02015 – OVERBURDEN GROUNDWATER MONITORING WELLS. The locations for monitoring well installation are shown on the Drawings.

15. **Demobilization**

    The Contractor shall remove its and all its Subcontractor's personnel, equipment, and materials offsite and leave the Site in a physical condition acceptable to the Owner. The Contractor shall remove all debris, including unused material as required by the Owner, offsite during demobilization.

1.05 CONTRACT DOCUMENTS

A. In addition to the Specifications contained herein, the Contractor shall perform the work in accordance with the following Contract Documents:

1. Drawings; and
2. Support Plans – Site Operation Plan and Construction Health & Safety Plan.

1.06 REFERENCE DOCUMENTS

A. The following documents are for information only, and are available to the Contractor in the Administrative Record for the Site located at Information Repository at Keesler Air Force Base, Mississippi and the Public Library located at Biloxi, Mississippi. The Owner makes no representation that the following list of reference documents is complete or adequate to perform the work specified herein. The Contractor shall be responsible for determining and obtaining the necessary documents for performing the work.

1. April 1997, *Joint Application and Notification, NWP #38 PCN, Prepared for Proposed Interim Stabilization Measure for SWMU 9, Landfill 3*, Keesler Air Force Base, Mississippi, April 1997.
2. April 1999, *RCRA Facility Investigation Report Group I Sites*, Keesler Air Force Base, Mississippi, April 1999.
3. March 2000, *Corrective Measure Study Report, Landfill 3*, Keesler Air Force Base, Mississippi, March 2000.
4. March 2000, *Corrective Measure Study Report, Landfill 2*, Keesler Air Force Base, Mississippi, March 2000.
5. July 2000, *Construction Documentation Report, Interim Stabilization Measure (Phase II of II), Landfill 3*, Keesler Air Force Base, Mississippi, July 2000.

6. January 2001, *Phase II Corrective Measure Study Report, Landfill 2*, Keesler Air Force Base, Mississippi, January 2001.
7. February 2001, *Quality Program Plan, Landfill 2, Landfill 3, Old Civil Engineering Storage Area*, Keesler Air Force Base, Mississippi, February 2001.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 GENERAL INFORMATION

A. The Contractor is on notice that the Work is being performed on a solid waste management unit (SWMU) as defined under Resource Conservation and Recovery Act of 1980, as amended, and the Site contains hazardous waste constituents. The Contractor shall be responsible for developing a site-specific Construction Health and Safety Plan (CHSP) for his operations. The Contractor shall implement this plan taking precautions necessary to protect the public and work force personnel from potential hazards.

B. Access to the Site is restricted. All personnel, equipment, and material used for the construction of Landfill 3 cover shall be signed in at the designated Keesler AFB entrance gates.

C. For any work performed in close proximity to the properties of businesses, utilities, or other parties, the Contractor shall utilize every precaution to protect the property, utility lines, trees, walls, and other structures from damage. Any damage that the Contractor may inflict shall be repaired or replaced in a prompt manner as directed by the Owner's Representative.

D. The Contractor shall take all measures required to minimize adverse impacts from execution of the work on residences and businesses near the Site. The working hours at the Site shall be between 7 a.m. and 5 p.m. Monday – Friday, excluding federal holidays.

E. The Contractor shall conduct work at the Site, and on streets and highways in a clean and orderly manner.

3.02 CONTRACTOR'S DUTIES

A. Prepare and obtain Owner/Owner’s Representative approval for all Contractor-prepared project plans.

B. Obtain approval for all subcontracts.

C. Obtain all necessary digging, building, construction, burn, erosion control, and operating approvals, permits, and consents.

D. After obtaining approval of the project plans and schedule, the Contractor shall start, construct and complete the project in accordance with the Drawings, Specifications, and support plans.

E. Establish means of, and techniques and procedures for, constructing and otherwise executing the project.

F. Furnish the following and pay the cost thereof:
   1. Labor and supervision.
   2. Supplies, materials, equipment, tools, and machinery.
   3. Water, electricity, telephone and other utilities necessary to properly execute and complete the work.
   4. Other facilities and services necessary to execute and complete the Work in accordance with the Contract Documents.

G. Pay all costs associated with transport and disposal of the waste generated during the performance of the Work.

H. Pay costs of all legally required sales, consumer, and use taxes, and any governmental fees.

I. Perform the Work in accordance with those codes, ordinances, rules, regulations, orders, and other legal requirements of governmental bodies and public agencies which bear upon performance of the Work.

J. Maintain order, safe practices, and proper conduct at all times among Contractor's employees.

K. Coordinate activities of the suppliers and subcontractors, if any, performing the Work.

L. Perform the work as specified and in a timely manner.

3.03 SEQUENCE OF WORK

A. The Contractor shall perform the work in the general order presented in Subpart 1.04 of this Section and illustrated on the Drawings. Certain activities can be performed simultaneously to minimize the total time. Deviations from this sequence of work shall require prior approval of the Owner or Owner's Representative. A schedule shall be submitted in accordance with requirements of Section 01310 – PROGRESS SCHEDULE.

3.04 OTHER REQUIREMENTS

A. The Contractor shall be responsible for using special care and/or special considerations that may be necessary for proper execution of the Work, but which may not be identified in this subpart. The Contractor shall comply with the entire requirements of the Specifications and will exercise special care wherever required for proper execution of the intended work under the Contract.

B. The Contractor shall be responsible for obtaining all required permits and approvals for the proper execution of the Work.

END OF SECTION 01010

SECTION 01020

AS-BUILT DRAWINGS

PART 1 - GENERAL

1.01 AS-BUILT DRAWINGS

A. The Contractor shall provide an 'as-built' record of the construction. This requirement is partitioned into two categories, (1) General Changes and (2) Site Plan Record.

1.02 SUBMITTALS

A. Submittals shall be made in accordance with Section 01300 – SUBMITTALS and the requirements of this section.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 GENERAL CHANGES

A. A full set of contract drawings shall be maintained by the Contractor at the Site for the purpose of recording any changes.

B. Site Plan: The Contractor shall record all items and deviations including those not originally shown. This information shall be forwarded to the Surveyor for inclusion into the Site Plan Record. All pertinent information shall be measured and recorded, i.e., depth of lines, distance to manholes, distance to reference objects, etc.

C. All Other Sheets: Changes and deviations, including modification to the original contract drawings, on all sheets other than the site plan will be marked with a red pencil. These 'as-built' changes shall be recorded accurately, with written notes as necessary for clarification.

3.02 SITE PLAN RECORD

A. The Contractor shall conduct an 'as-built' survey of the Site upon completion of the construction activities. The Contractor shall employ the services of a Registered Land Surveyor (Surveyor) in the State of Mississippi to conduct the survey of the site for the purpose of generating this Site Plan Record. The Surveyor shall employ the generally recognized practices and accuracy of Professional Surveying, shall affix his/her seal and sign the final results.

B. General Requirements:

1. The area required for this Site Plan Record shall include, at a minimum, the construction limits shown on Drawings. All physical features shall be included as well as underground utilities. All information on the underground utilities derived from the construction of the project shall be provided by the Contractor for inclusion into the survey.
2. The survey shall be provided using standard border, format, and layering scheme provided by the Base Civil Engineering, Keesler AFB. The platform for the survey shall be AutoCAD®, version 12 for Windows®.
3. The drawing shall be layered for each feature, such as storm drain, sanitary sewer, contour lines, electrical, etc. A standard for the Keesler AFB layering system shall be provided by the Base Civil Engineer.
4. All manholes, inlets, etc. shall show top elevation and inverts of all pipes connected to the manhole. Each run of pipe shall show the slope to the nearest hundredth of a percent and length to the nearest 1 foot.
5. Topographic contour intervals shall be 0.5 feet.
6. Elevation of available benchmarks will be provided by the Base Civil Engineer. A copy shall be submitted to the Base Civil Engineer for approval.
7. Upon receipt of approval, the survey shall be drawn on 30 x 42 in (E-size) Mylar film, 4 mil thick, matted on one side. An electronic copy shall also be submitted on standard CD-ROM (compact disc), or a 3-inch high-density floppy diskette.

C. Accuracy: The horizontal and vertical features of the survey shall be within an accuracy generally accepted by a Class B survey as defined by the State of Mississippi. All elevations shall be to the following minimum accuracy:

1.	Pavements, slabs, manholes, solid objects, etc.	0.01 feet
2.	Soil, gravel surfaces, grass surfaces, etc.	0.1 feet
3.	Contour lines	0.25 feet

D. Monuments: The Contractor shall set two control monuments. These monuments shall become the horizontal and vertical control for the survey. The two monuments shall be set by the Contractor at locations furnished by the Base Civil Engineer, which shall be located within the general area of the construction site. Details for construction of these monuments are shown on the Drawings.

E. Markers

1. The Contractor shall embed into each concrete monument a dome shaped bronze marker. These markers shall be as manufactured by Bernsten, type C1 Concrete Marker, or approved equal.
2. The Contractor shall have 12 markers each imprinted with the lettering as shown on the Drawings. Two markers shall be imbedded into the monuments set by the Contractor. The remaining ten markers shall be turned over to the contracting officer within 60 days after the notice to proceed and become property of the government.

F. Survey Control

1. The Surveyor shall determine the horizontal coordinates of the monuments.
2. The reference datum to be used is the State Plane Coordinating system.
3. The control monument which is to be used is USGS marker "BILO" located near the Biloxi lighthouse near the intersection of Porter Avenue and US Highway 90.
4. These coordinates shall be tied to another known point located on base. The Surveyor shall also establish vertical elevation of the monuments to an accuracy of 3 millimeters.

G. Metric Units: The Surveyor shall establish horizontal and vertical control for the monuments in Standard English units and metric units. The survey shall be conducted in metric units.

H. An ASCII file of a complete list of survey points. The file should be comma delineated with the following data for each point:

1. Point number,
2. Easting (x-coordinate),
3. Northing (y-coordinate),
4. Elevation, and
5. Description.

This file shall be submitted to the Owner on a 3-1/2" high-density diskette or a CD-ROM. A hardcopy (8.5" x 11"size paper) of the list of survey points shall also be provided to the Owner.

END OF SECTION 01020

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.01 SCOPE

A. This section sets forth the procedures for measurement and payment of the bid item prices. All labor, materials, and equipment necessary to carry out the Work as specified and shown shall be paid under one of the bid items as set forth in Subpart 1.02 below. Schedule A.1, included in SECTION 00300 - BID FORM, includes all of the bid items of both lump sum and unit price types. Schedule A.1 must be completed for each bid item.

B. Schedule A.2 (SECTION 00300 - BID FORM) includes labor and equipment mix, unit rates, and loading for completing work included in each bid item within the Period of Performance specified. Schedule A.3 (SECTION 00300 - BID FORM) lists material type, quantity, unit rate, and cost for those bid items that are applicable. Schedule A.3 also lists the percent mark-up the Contractor proposes to apply to materials purchased for the site work. The Successful Bidder shall submit, within ten (10) working days after receiving the Notice of Award, completed Schedule A.2 for each bid item included in Schedule A.1, and shall submit completed Schedule A.3 for the applicable bid items. Material cost will not be reimbursed unless the material purchase and purchase price was previously approved by the Owner or Owner's Representative.

C. The Work completed under the Contract shall be measured according to United States standard measures. Payment will be based on the actual quantity of work performed under the various classifications of work in the contract unless otherwise provided below or in the method of measurement for the various classes of work involved. The Owner will exercise such controls and make such measurements as are necessary to assure that each item of work is done in substantial compliance with the Contract Documents.

D. For all Work specified in the Contract Documents but for which no separate bid item is included, it shall be the Contractor's responsibility to include those costs among the specified Bid Items. In this respect, the Bid Items shall be inclusive of the costs for such items as safety provisions, procurement, administration, overhead and profit, submittals on materials and equipment, testing, clean-up, warranties, and related required items. The bid items reflect the actual payment for all labor, materials, and equipment involved in the project. Any work required for the satisfactory completion of the project which is not itemized shall be considered incidental to the bid items.

E. The Contractor shall be responsible for selecting and implementing the appropriate levels of personnel protective equipment (PPE) for its workers. No adjustments to the contract value will be made for different levels of PPE.

F. The Contractor shall receive and accept payment for Work performed as measured in accordance with the following subpart, except as hereafter modified by Change Order.

1.02 MEASUREMENT, PAYMENT, AND DEFINITIONS

A. BID ITEM 1-PRE-CONSTRUCTION ACTIVITIES

The work items that shall be conducted under pre-construction activities shall include the following:

A. Pre-Construction Conference (Bid Item 1.A); and

B. Preparation of Plans (Bid Item 1.B).

BID ITEM 1.A-PRE-CONSTRUCTION CONFERENCE

Measurement and payment will be on a lump sum basis for the pre-construction conference. The payment for this bid item shall constitute full compensation for attending the pre-construction conference at the Site including the preparation and presentation of the construction schedule and obtaining the necessary approvals, permits, and consents to start and execute the Work.

BID ITEM 1.B-PREPARATION OF PLANS

Measurement and payment will be on a lump sum basis for the preparation of each plan listed below. The payment for this bid item shall constitute full compensation for all labor, materials, and equipment necessary to prepare drafts; revise drafts in response to the Owner, Owner's Representative, and state or federal regulatory agency's reviewers' comments; to submit final versions that are acceptable and approved by the Owner; and all items not mentioned but required to complete the Work. The Successful Bidder shall start work on this bid item immediately upon the receipt of Notice of Award. The Work under this bid item shall be considered complete upon acceptance of the final revisions of the plans by the Owner. No extra compensation shall be made for more then one (1) draft revision of the Plans. Plans covered by this measurement and payment schedule shall include:

1. Site Operations Plan (SOP) - (5 draft/10 final copies);
2. Construction Health and Safety Plan (CHSP) - (5 draft/5 final copies); and
3. Storm Water Pollution Prevention Plan - (5 draft/10 final copies).

B. BID ITEM 2-MOBILIZATION

Measurement and payment will be on a lump sum basis. The payment for this bid item shall be made after the acceptance by Owner for all the activities including mobilization of labor, materials, equipment, and all other items to commence Work. The total cost for mobilization to the Site shall not exceed 2.5% of the total Bid Price.

C. BID ITEM 3-DEMOLITION

Measurement and payment for this bid item shall be on a lump sum basis. The payment for this bid item shall include labor, materials, and equipment costs incurred by the Contractor to demolish the items as described in the Specifications and shown on the Drawings. This bid item shall also constitute the costs incurred by the Contractor for the disposal of all debris (except that described in Bid Item 8.A) resulting from the demolition activities.

D. BID ITEM 4-SITE CLEARING

Measurement and payment for this bid item shall be on a lump sum basis. The payment for this bid item shall include labor, materials, and equipment costs incurred by the Contractor for the site clearing, complete. The extent of areas requiring clearing is shown on Drawings. The site clearing activities shall be conducted according to the Specifications.

E. BID ITEM 5-INITIAL SITE PREPARATION

The work items that shall be conducted under this bid item shall include the following:

A. Utilities (Bid Item 5.A);
B. Fencing and Security (Bid Item 5.B);
C. Sedimentation and Erosion Controls (Bid Item 5.C);
D. Site Access Roadway Construction (Bid Item 5.D); and
E. Support Areas (Bid Item 5.E).

Measurement and payment for each of the above-listed work items shall be on lump sum basis as described below. The Contractor shall submit to the Owner payment requests up to 90 percent of the lump sum costs for the construction/installation of the above-listed work items. The remaining 10 percent of the lump sum costs is understood to be applied toward the maintenance costs for the work items over the duration of the Work. The Contractor shall submit payment requests for the remaining 10 percent of the lump sum cost for each of the work items in uniform monthly installments over the duration of the Work.

BID ITEM 5.A-UTILITIES

Measurement and payment for extending, installing, upgrading, and maintaining temporary utilities at the Site during the performance of the Work shall be on a lump sum basis. The payment for this bid item shall constitute full compensation for the labor, materials, equipment, and services necessary for providing and maintaining the following on-site temporary utilities: telephone, water, sanitary facilities, electricity, lighting, and all items not mentioned but required to complete the Work.

BID ITEM 5.B-FENCING AND SECURITY

Measurement and payment for installing and maintaining construction fence around the Site shall be on a lump sum basis. The payment for this bid item shall constitute full compensation for the labor, materials, equipment, and services necessary for installation and maintenance of the construction fence. This bid item shall also constitute the costs incurred by the Contractor for the security of all materials, equipment, and all other items on the Site throughout the duration of the Work.

BID ITEM 5.C-SEDIMENTATION AND EROSION CONTROLS

Measurement and payment for installing and maintaining sedimentation and erosion controls in accordance with the Specifications shall be on lump sum basis. The payment for this bid item shall constitute full compensation for the labor, materials, equipment, and services necessary for the installation and maintenance of the sediment and erosion controls complete including, but not limited to, the following: silt dams, traps, barriers, turbidity curtains, hay bales, silt fences, grassing, mulching, seeding, watering, reseeding, storm water drainage structures, and rip-rap.

BID ITEM 5.D-SITE ACCESS ROADWAY CONSTRUCTION

Measurement and payment for constructing the site access road and maintaining the constructed road for the duration of the Work shall be on lump sum basis. The payment for this bid item shall constitute full compensation for the labor, materials, equipment, and services necessary for the construction and maintenance of the site access road as described in the Specifications.

BID ITEM 5.E-SUPPORT AREAS

Measurement and payment for the preparation, installation, and maintenance of the support areas shall be on a lump sum basis. The payment for the bid item shall constitute full compensation for the labor, materials, equipment, and services necessary for furnishing and maintaining the field offices for the Owner and Owner's Representative and one for the Contractor. The Contractor shall set up the office trailers as described in the Specifications. As part of this bid item, the Contractor shall prepare and maintain the parking area at the office trailers as described in the Specifications. This bid item shall also constitute the costs incurred by the Contractor for the installation, maintenance, and removal of a temporary fence and lockable gate around the support areas.

F. BID ITEM 6-STORM DRAIN PIPE CONSTRUCTION

Measurement and payment for the construction of storm drain pipe shall be on a lump sum basis. The payment for this bid item shall constitute full compensation for all labor, materials, equipment, and all items required to construct the storm drain pipe complete including, but not limited to, the following: concrete pipes, manholes, fittings, inlets, drop inlets, and outfall structures. The location and layout of the storm drain pipe is shown on the Drawings. The storm drain pipe shall be constructed as described in the Specifications.

G. BID ITEM 7-WATER MANAGEMENT

Measurement and payment for the disposal of construction water shall be in accordance with the following bid items:

BID ITEM 7A–WATER DISPOSAL WITHOUT TREATMENT

Measurement and payment for the disposal of construction water without treatment shall be on a lump sum basis. The construction water will be disposed into the Back Bay of Biloxi without any treatment if it meets with all the applicable water quality criterion.

BID ITEM 7B–WATER DISPOSAL WITH TREATMENT

Measurement and payment for the disposal of construction water requiring treatment shall be on unit price per gallon basis. The construction water will be disposed into the Back Bay of Biloxi with treatment if it does not meet with any applicable water quality criteria. The payment for this bid item (Bid Items 7.B.1 or 7.B.2) shall constitute all labor, materials, and equipment required for the treatment and disposal of the construction water.

H. BID ITEM 8-WASTE LOADING, TRANSPORTATION, and DISPOSAL

Measurement and payment for the disposal of waste shall be in accordance with the following bid items:

BID ITEM 8A-ASPHALT CART PATH DEMOLITION WASTE

Measurement and payment for the asphalt cart path demolition waste that will be placed as backfill for grading prior to placing the cap shall be on a lump sum basis. The payment for this bid item shall constitute all labor, materials, and equipment needed for the placement of asphalt cart path demolition waste as backfill in accordance with the Specifications.

BID ITEM 8B-WASTE DISPOSAL AT LANDFILL

Measurement and payment for this bid item shall be on a unit price per ton basis for the waste material that will be disposed at a landfill. The payment for this bid item (Bid Items 8.B.1 or 8.B.2) shall constitute full compensation for all labor, materials, vehicles, fuel, and equipment necessary to handle, transport, and dispose the waste at the Owner-approved landfill, maintain records, and all items not mentioned but required to complete the Work. The measurement of the waste disposal at landfill shall be based on the manifests signed by authorized personnel of the landfill company.

I. BID ITEM 9-SUBGRADE FILL PLACEMENT

Measurement and payment for the subgrade fill placement shall be on a lump sum basis. The subgrade fill material shall be off-site backfill material as described in the Specifications. The payment for this bid item shall constitute full compensation for labor, materials, equipment, and all items not mentioned but required, for all activities to conduct and complete the bid item.

The bid item shall include placement, compaction, and grading of the subgrade fill material to the alignment and elevations shown on Drawings. This work will be conducted in accordance with the Specifications. The activities that shall be conducted under this pay item include:

1. Furnishing backfill from an Owner-approved off-site sources;
2. Preparation of the landfill cover areas to receive backfill;
3. Placement of backfill as a subgrade fill material in lifts and compact to specified grades; and
4. Services of Registered Land Surveyor to survey the grades and elevations of the subgrade fill layer.

J. BID ITEM 10-METHANE COLLECTION SYSTEM

Measurement and payment for the methane collection system shall be in accordance with the following bid items:

BID ITEM 10A-GAS COLLECTION TRENCH INSTALLATION

Measurement and payment shall be on a lump sum basis for the installation of methane gas collection trench. The payment for this bid item shall constitute full compensation for labor, materials, equipment, and services needed to excavate the gas collection trench, placement of non-woven geotextiles along the trench, placement of perforated gas vent pipe and fittings, placement of granular material in the gas collection trench, and all items not mentioned but required to complete this bid item. The gas collection trench shall be installed as described in the Specifications and as shown on the Drawings.

BID ITEM 10B-GEONET PLACEMENT

Measurement and payment shall be on a lump sum basis for the placement of geonet. The payment for this bid item shall constitute full compensation for all labor, materials, equipment, and all items not mentioned but required to install the geonet. The location and layout of the geonet is shown on the Drawings. The geonet shall be installed in accordance with the Specifications.

BID ITEM 10C-GEONET PROTECTION LAYER

Measurement and payment for this bid item shall be on a lump sum basis for the placement of geonet protection layer. The off-site backfill soil used for the geonet protection layer shall be in accordance with the Specifications. The payment for this bid item shall constitute full compensation for labor, materials, equipment, and all items not mentioned but required, for all activities to conduct and complete the bid item.

The bid item shall include placement, compaction, and grading of the geonet protection layer to the alignment and elevations shown on Drawings. This work will be conducted in accordance with the Specifications. The activities that shall be conducted under this pay item include:

1. Furnishing backfill from an Owner-approved off-site sources;
2. Preparation of the geonet surface area to receive backfill;
3. Placement of backfill as geonet protection layer in lifts and compact to specified grades; and
4. Services of Registered Land Surveyor to survey the grades and elevations of the geonet protection layer.

BID ITEM 10D-METHANE VENT STANDPIPE INSTALLATION

Measurement and payment for the methane vent standpipe installation shall be on a lump sum basis. The payment for this bid item shall constitute full compensation for all labor, materials, equipment, and all items required to install the methane vent standpipe complete including, but not limited to, the following: vent riser pipe, fittings, concrete pad, anchor pads, and Rohn fence. The location and layout of the methane vent standpipe is shown on the Drawings. The methane vent standpipe shall be installed as described in the Specifications.

K. BID ITEM 11-GEOSYNTHETIC CLAY LINER (GCL) LAYER

Measurement and payment for the GCL Layer shall be in accordance with the following bid items:

BID ITEM 11A-GCL PLACEMENT

Measurement and payment shall be on a lump sum basis for the placement of GCL. The payment for this bid item shall constitute full compensation for all labor, materials, equipment, and all items not mentioned but required to install the GCL. The location and layout of the GCL is shown on the Drawings. The GCL shall be installed in accordance with the Specifications.

BID ITEM 11B-BARRIER PROTECTION LAYER

Measurement and payment for this bid item shall be on a lump sum basis for the placement of barrier protection layer. The off-site backfill soil used for the barrier protection layer shall be in accordance with the Specifications. The payment for this bid item shall constitute full compensation for labor, materials, equipment, and all items not mentioned but required, for all activities to conduct and complete the bid item.

The bid item shall include placement, compaction, and grading of the barrier protection layer to the alignment and elevations shown on Drawings. This work will be conducted in accordance with the Specifications. The activities that shall be conducted under this pay item include:

1. Furnishing backfill from an Owner-approved off-site sources;
2. Preparation of the GCL surface area to receive backfill;
3. Placement of backfill as barrier protection layer in lifts and compact to specified grades; and
4. Services of Registered Land Surveyor to survey the grades and elevations of the barrier protection layer.

L. BID ITEM 12-IRRIGATION SYSTEM

Measurement and payment for the installation of irrigation system shall be on a lump sum basis. The payment for the bid item shall constitute full compensation for all labor, equipment, materials, and all items required to install a functional irrigation system complete including, but not limited to, the following: excavation and backfilling, piping, fittings, sprinkler heads, pumps, valves, backflow preventers, meters, controls, pipe sleeves, and plumbing. The location and layout of the irrigation system is shown on the Drawings. The irrigation system shall be installed as described in the Specifications.

M. BID ITEM 13-GOLF COURSE LANDSCAPING AND RELATED STRUCTURES

Measurement and payment for the golf course landscaping and related structures shall be in accordance with the following bid items:

BID ITEM 13A-CART PATH CONSTRUCTION

Measurement and payment shall be on a lump sum basis for the construction of the cart path. The payment for this bid item shall constitute full compensation for labor, materials, equipment, and services needed to place the graded aggregate base, primer coat, base coarse mixture, tack coat, surface coat, and all items not mentioned but required to complete this bid item. The cart path shall be constructed as described in the Specifications and shown on the Drawings.

BID ITEM 13B-LANDSCAPING

Measurement and payment for landscaping green area, fairways, teeing area, rough and disturbed areas shall be on a lump sum basis. The payment for this bid item shall constitute full compensation for labor, materials, equipment, and all items not mentioned but required, for all activities to conduct and complete the bid item. The bid item shall include establishment of grass within the areas shown on Drawings. This work will be conducted in accordance with the Specifications. The activities that shall be conducted under this pay item include:

1. Providing topsoil for the areas called for placement of topsoil;
2. Placement of topsoil and compact it to the specified grades;

3. Preparation of areas called for sprigging, sodding, or mulching;
4. Installing sprig, sod, or mulch as required in green areas, fairways, teeing area, rough, and disturbed areas;
5. Protection of sprigged or sodded areas; and
6. Cleanup, watering, and maintaining the grassed areas until the completion of Work.

N. BID ITEM 14-MONITORING WELL INSTALLATION

Measurement and payment shall be lump sum for the installation of each monitoring well. The payment for this bid item shall constitute full compensation for labor, material, equipment, and services needed to install a monitoring well complete including, but not limited to, the following: borehole drilling, well screen and riser, sand pack, bentonite seal, grout mixture, concrete surface seal, protective casing, bumper guards, and all items not mentioned but required to complete this bid item. The proposed well locations and a cross-sectional view of monitoring well construction are shown on the Drawings. The monitoring wells shall be installed as described in the Specifications.

O. BID ITEM 15-DEMOBILIZATION

Measurement and payment for the Contractor demobilization shall be on a lump sum basis. The payment for this bid item shall constitute full compensation for labor, materials, equipment, and all items not mentioned but required to remove all of the temporary trailers, modular buildings, equipment, electrical and telephone services, including power and telephone poles, vehicles, temporary equipment and structures, and perform all work required for site clean up of construction materials. Payment for this bid item shall also include grading, placing of topsoil and landscaping operations area, and all other areas that were disturbed during performance of demobilization activities within the Site. The total cost for demobilization from the Site shall not exceed 2.5% of the total Bid Price.

1.03 DETERMINATION OF UNIT PRICE QUANTITIES

The Contractor shall submit, with his request for payment, the actual quantities and classifications of unit price Work performed to the Owner. The Owner will review the quantities with the Owner's Representative and the Contractor before rendering a decision on the acceptability of these quantities. This decision will be final and binding upon the Owner and the Contractor.

1.04 SCHEDULE OF VALUES

A. The Contractor shall submit to the Owner for approval, in the form directed by or acceptable to the Owner, a complete schedule of values of the various portions of Work, including breakdown of labor, materials, equipment, and estimated quantities for the various lump sum bid items, aggregating the Contract Price. The schedule of values shall subdivide the Work into component parts in sufficient detail to serve as the basis of progress payments during construction and to verify the progress of construction with the progress schedule and shall be supported by such data to substantiate its correctness as the Owner may require. Each item in the schedule of values shall include its proper

share of overhead and profit. An unbalanced breakdown providing for overpayment to the Contractor on items of work that would be performed first will not be approved. Upon acceptance of the schedule of values by the Owner, the Contractor shall incorporate it into a form of Application for Payment acceptable to the Owner.

B. The approved project schedule with dollar values as a resource, for each activity, shall constitute the schedule of values for the project. Unsupported or unreasonable allocation of the contract price to any one activity shall be justification for rejection of the schedule. No payment shall be made until the schedule, with the activity dollar resources, has been approved by the Owner. The application for payment shall delineate all activities on the schedule, the approved value, previous percentage complete approved, current percentage complete requested, and value of percentage requested.

1.05 PAYMENT FOR EXTRA WORK

A. Extra Work which results from any of the changes shall not be started until authorization from the Owner is received in writing, which shall state the items of extra work to be performed and the method of payment for each item. Work performed without written authorization from the Owner will not be paid.

B. Payment for Extra Work shall be either on a lump sum price or on unit prices as determined by the Owner.

1.06 PAYMENT FOR ITEMS OMITTED WHEN PARTIALLY COMPLETED

A. Should the Owner cancel or alter any portion of the Contract, resulting in the elimination or noncompletion of any portions of the Work partially completed, the Contractor will be allowed payment covering all items of work incurred prior to the date of cancellation, alteration, or suspension of such work.

B. The Contractor shall be allowed a mark-up of 15% on the materials used and the construction work actually performed at the rates specified in the Contract but no allowance will be made for any change in anticipated profits. Acceptable materials ordered by the Contractor or delivered to the site prior to the date of its cancellation, alteration, or suspension by the Owner shall be purchased from the Contractor by the Owner at actual cost and shall thereupon become the property of the Owner or, at the option of the Owner, the unused acceptable material shall remain the property of the Contractor and he shall be paid the actual cost including freight, unloading, and hauling costs less the actual salvage value.

1.07 PARTIAL PAYMENT

A. Once each month, the Contractor shall make an estimate, in writing, of the amount of Work performed and the value thereof. This estimate shall be the quantities for unit price work and an estimate of the value (percent) of all lump sum items partially completed. If the character and progress of the Work have been satisfactory to Owner, the Owner shall pay 90% of the approved portions of each Application for Payment and shall withhold 10% as retainage until the amount of Work completed is equal to 50% of the value of the Contract. Once the cumulative value of the Owner-approved

Applications for Payment exceeds 50% of the value of the Contract, and if the character and progress of the Work have been satisfactory to Owner, there will be no additional retainage on account of Work completed. Retainage may be reinstated or increased for schedule slippage, delinquent submittals or defective work.

B. The Contractor warrants and guarantees that title to all work, materials and equipment covered by an Application for Payment, whether incorporated in the project or not, will have passed to the Owner prior to making Application for Payment, free and clear of all liens, claims, security interests and encumbrances; and that no work, materials or equipment covered by an Application for Payment will have been acquired by the Contractor or by any other person performing the Work at the site or furnishing materials and equipment for the project which is subject to an agreement under which an interest therein or encumbrance thereon is retained by the seller or otherwise imposed by the Contractor or such other person.

C. The retainage of the Contract set forth shall be held by the Owner until all work is satisfactorily completed. The retainage shall be paid with the final payment. No interest shall be determined or paid by the Owner on the retainage.

1.08 ACCEPTANCE AND FINAL PAYMENT

A. Whenever Work required by the Contract has been completed on the part of the Contractor and the Owner has approved all parts of the Work, a final change order will be prepared showing the value of the Work completed by the Contractor. The amount of this Owner-approved change order shall be used by the Contractor to prepare the final Application for Payment. The final Application for Payment shall be paid by the Owner to the Contractor in accordance with Subpart 1.10, provided the Contractor has 1) furnished to the Owner all Project Record Documents described in the Contract Documents and final documentation; and 2) satisfactory evidence that all sums of money due for any labor, materials, apparatus, fixtures, or machinery furnished for the purpose of the Work have been paid or that the person or persons to whom the same may be due have consented to such final payment.

B. Acceptance of final payment shall constitute a Contractor's release and waiver of any and all claims under the terms of the Contract.

1.9 PAYMENTS TO CONTRACTOR

Invoice payments shall be made to the Contractor within forty-five (45) days of the receipt of the invoice (in a form acceptable to the Owner) by the Owner. Should any invoice or any part thereof is in dispute, the Owner shall be entitled to withhold payment of that portion of the disputed invoice until the disputed item is resolved. The Contractor shall consider any such dispute a priority issue and every reasonable effort shall be made to resolve the dispute expeditiously.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01025

SECTION 01060

REGULATORY COMPLIANCE

PART 1 - GENERAL

1.01 SECTION INCLUDED

A. SCOPE

1. The Contractor shall comply with all federal, state, and local laws as they apply to the work described herein and as shown on the Drawings.
2. The Contractor shall be responsible for payment of all fines and penalties that may be established as a result of the Contractor's failure to comply with federal, state, and local laws as they apply to the work described herein and as shown on the Drawings.
3. The Contractor shall be responsible for identifying and obtaining all local, state and federal permits, licenses, authorization, and documentation necessary to conduct the work.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01060

SECTION 01065

SAFETY, HEALTH, AND EMERGENCY RESPONSE REQUIREMENTS

PART 1 - GENERAL

1.01 SCOPE

This section describes existing site conditions, regulatory requirements and applicable publications, emergency response and contingency procedures, site control activities, and record keeping requirements.

1.02 SUBMITTALS:

A. The Contractor shall submit a Construction Health and Safety Plan (CHSP), and qualifications of the Site Health and Safety Officer (SHSO) to the Owner for review and approval.

B. The Contractor shall submit the CHSP to the Owner at least 30 days prior to initiating the work at the Site.

C. Submittals shall be made in accordance with SECTION 01300 – SUBMITTALS.

1.03 EXISTING SITE DESCRIPTION

A. General Site Description:

1. Kessler AFB is located within the city limits of Biloxi, Mississippi, approximately 80 miles east of New Orleans, Louisiana, and 60 miles west of Mobile, Alabama. The general Site area (Landfill 3), also known as Solid Waste Management Unit (SWMU) 9, is a small peninsula on the northern edge of the Base and extends out into the Back Bay. Landfill 3 is approximately 10 acres in extent. Part of the southern portion of Landfill 3 is also part of the current Base golf course.
2. The landfill site consists of Landfill 3 (SWMU 9), and four other SWMUs (SWMUs 3, 4, 6, 10) and one area of concern (AOC) E. These units are collectively referred to as Landfill 3. Landfill 3 was built up on marshland by filling in with refuse, native soil, construction debris, and asphalt. The landfill does not have a liner or leachate collection system.
3. In addition to the past landfilling activities, the surface of the Site has been used for temporary storage of asphalt debris, sand bags, fill dirt, and concrete rubble.
4. An interim stabilization measure (ISM) was completed in 2000. As part of the ISM, a steel sheet piling bulkhead wall was installed to contain the landfill site; stormwater piping was installed to provide a means of water discharge past the sheet piling bulkhead wall; soil/debris and concrete rubble stockpiles were processed and/or removed from the site; and a temporary soil cover was constructed over the landfill to provide positive drainage and to reduce the infiltration of stormwater into the landfill.

B. Site History and Characteristics:

1. The Site was operated by Keesler AFB as a landfill from 1950 to 1974. A brief description of the environmental history of each of the SWMUs is presented below:

a. Old Fire Protection Mock-Up Area (SWMU 3)

This SWMU is centrally located within the Landfill 3 area and was used from 1950 to 1981. This SWMU consisted of a 100-foot diameter circular area with an earthen base surrounded by a twelve to eighteen inches high earthen dike. Approximately 300 gallons of spent fuels (JP-4 mixed with 10 percent diesel fuels) and water were used during fire training exercises, which were conducted approximately eight times per year.

b. New Fire Protection Mock-Up Area (SWMU 4)

In 1981, this SWMU was constructed on top of the Old Fire Protection Mock-Up Area (SWMU 3). SWMU 4 consisted of a 100-foot diameter circular concrete pad with a six-inch high concrete dike surrounding the pad, and a fuel drainage and collection system. Fuels for fire training exercises were stored in an above-ground tank, and piped to the burn pit in five steel lines that ran along the ground surface for approximately 250 feet and underground for the remaining 150 feet to the fire training area. Approximately 400 to 600 gallons of JP-4 and diesel fuel were mixed with 1,500 gallons of water for each training exercise. After the exercise, the non-combusted mixture was pumped to a 2,000-gallon aboveground reclamation tank, where the fuel and water were separated. The fuel was reclaimed and the water was discharged onto the ground or into the Back Bay. Fire training exercises at SWMU 4 were discontinued in 1989.

c. Smaller Concrete Burn Area (SWMU 6)

SWMU 6 was used for small fire training exercises and is associated with the New Fire Protection Mock-Up Area. This area was constructed in 1981 and is composed of a twenty-foot diameter concrete pad with a six-inch high earthen dike around the perimeter. Approximately 50 gallons of fuel, with a larger quantity of water, were used during fire training exercises. The spent fuel and water were treated in the same manner as that for SWMU 4. Fire training exercises in this area were discontinued in 1989.

d. Drum Storage Area (SWMU 10)

The Drum Storage Area (DSA) consists of a concrete slab approximately 10 feet wide and 40 feet long. Empty or nearly empty 55-gallon drums containing asphalt sealant mix, oil, diesel fuel, and solvents were stored at this location for off-Base disposal. The DSA was operated from 1972 to 1989.

e. Asphalt Sealant Spray Area (AOC E)

AOC E is located adjacent to Building 6752, which is a small storage building. Fifty-five gallon drums were sprayed with asphalt sealant. After the drums were sprayed, they were placed on the surrounding gravel surface. Building 6752 received overspray from the drum coating process. Spraying activities were discontinued in 1989.

2. A Resource Conservation Recovery Act (RCRA) facility investigation (RFI) was initiated in 1992 at Landfill 3. On the basis of the RFI results, a baseline risk assessment (BRA) and corrective measures study (CMS) were conducted. Upon review of the BRA and CMS, EPA requested that an ecological risk assessment be conducted for Landfill 3 and the Back Bay. The regulatory agencies in concurrence with Keesler AFB agreed that an interim measure to stabilize Landfill 3 through physical containment should proceed.
3. The BRA was completed through the implementation of the Risk-Based Work Plan. The ecological risk assessment was conducted concurrently for Landfill 3 and Landfill 2 since the two landfills are adjacent to each other and the Back Bay. The baseline risk assessment was completed as part of the Phase II CMS for Landfill 2 and concluded that in addition to the ISM that was completed for Landfill 3 in March 2000, final corrective actions were necessary at Landfill 3. The CMS for Landfill 3 was completed in March 2000 and the final alternatives included a low permeability cover, groundwater monitoring and land use controls.
4. Waste Characteristics: Chemicals detected in the environmental media at or near Landfill 3 include volatile and semivolatile organics, pesticides, polychlorinated biphenyls (PCBs) and metals.

1.04 DESCRIPTION OF REQUIREMENTS

A. The Contractor shall review USEPA Administrative Records for the Site and understand the Site hazards, known or potential. Site-specific health and safety procedures are required due to the potentially hazardous conditions at the Site. These procedures shall be described in the CHSP, which shall be prepared by the Contractor. The CHSP shall apply to all phases of the Contractor's scope of work as described in Section 01010 – SUMMARY OF WORK. The CHSP shall be reviewed by the Owner for the CHSP's compliance with requirements set forth in support of this specification. The CHSP may also be reviewed by EPA. The Contractor shall not begin work before receiving a notification from the Owner that the CHSP is in compliance with the requirements set forth in support of this section. The receipt of the CHSP's compliance notification from the Owner shall not relieve the Contractor from the responsibility of the meeting the Safety, Health, and Emergency Response requirements during the performance of work at the Site. The Contractor shall implement, maintain, and enforce these procedures during all phases of work.

B. The Contractor shall utilize the services of an industrial hygienist approved by the Owner and certified in comprehensive practice by the American Board of Industrial Hygiene (ABIH) to assist in the development and implementation of the CHSP, including conduct initial site-specific training and provide continued support for health and safety activities as needed, including the upgrading or downgrading of the level of personal protection.

C. The Contractor shall employ the services of a Certified Industrial Hygienist (CIH) to consult the Site Health and Safety Officer (SHSO).

D. The name, qualifications (education summary and documentation), and work experience of the CIH shall be submitted to the Owner prior to development of the CHSP.

E. In addition, the SHSO shall assist and represent the CIH in the continued implementation and enforcement of the CHSP. The SHSO shall be assigned on the Site whenever site activities are conducted and shall be either the Contractor's employee or a Subcontractor who reports to the Contractor and the CIH in matters pertaining to safety and health.

F. The qualifications of the SHSO shall include:
   1. A minimum of one year working experience at hazardous waste sites.
   2. A working knowledge of federal and state safety and health regulations.
   3. Specialized training in personal and respiratory protective equipment program implementation and in the proper use of air monitoring instruments and air sampling methods and procedures. Such training shall be conducted by the CIH or with the concurrence of the CIH.
   4. Certified as having completed training on first aid and cardiopulmonary resuscitation (CPR) by a recognized approved organization such as the American Red Cross, and be current on such training.
   5. Hazardous Waste Operations Training and Supervisory Training, and be current on such training.

G. The name, qualifications (education summary and documentation), and work experience of the SHSO shall be submitted to the Owner prior to commencement of work at the Site. If the Contractor proposes a substitution of personnel, the name, qualifications and experience of the SHSO shall be submitted in advance for approval.

H. The following definitions shall be used throughout the Contractor's CHSP:
   1. EPA or its representative (EPA): Any person identified as the corrective action Project Manager by the EPA. EPA's representative, if any, refers to any person working for EPA during the corrective action who is located on site.
   2. State's Project Coordinator (State): Any person so designated from the State Government.
   3. On-site Personnel: The Contractor and their representatives, EPA, the Owner and its representatives, and contractor personnel such as employees and subcontractors.
   4. Contract Personnel: Include Contractor employees and his representatives, Subcontractor employees, and his representatives.
   5. Visitor: All others, except the On-site Personnel.
   6. Site Health and Safety Officer (SHSO): See E. and F. above.
   7. Site: For the purpose of the CHSP, the Site shall include the Landfill 3 and all the areas within the limits of work as determined by the Owner.
   8. Monitoring: Indicates the use of direct or indirect reading field instrumentation to provide information regarding the levels of gases, vapors, and particulates which are being released during the construction of Landfill 3 cover. Monitoring shall be conducted to evaluate employee exposures to toxic materials.
   9. Physician: A licensed physician with experience in the practice of occupational medicine, and provided by the Contractor.

1.05 REGULATORY REQUIREMENTS AND APPLICABLE PUBLICATIONS

A. The Site-specific CHSP shall be consistent with and the Contractor shall comply with the requirements and guidelines of:

1. Occupational Safety and Health Administration (OSHA) Standards and Regulations contained in Title 29, Code of Federal Regulations, Parts 1910 and 1926 (29 CFR 1910 and 1926), including amendments as stated in Federal Regulations March 6, 1989: 9294-9336 Final Rule, 29 CFR 1910.120 "Hazardous Waste Operations and Emergency Response").
2. United States Environmental Protection Agency (U.S. EPA) Standard Operating Procedures and Quality Assurance Manual Revised May 1996.
3. NIOSH/OSHA/USCG/EPA Occupational Safety and Health Guidance Manual for Hazardous Site Activities, October 1985, NIOSH Publ. No. 85-115.
4. Threshold Limit Values for Chemical Substances in the Work Environment adopted by American Conference of Governmental Industrial Hygienists (ACGIH), 1988-89 or most recent version.
5. Construction Health and Safety Plan, Prepared for the Headquarters Air Education & Training Command/DEVR, Randolph Air Force Base, Texas, by Parsons Engineering Science, Inc., 1996.

B. The CHSP shall include but not necessarily be limited to the following components as required by OSHA 29 CFR 1910.120(I) (2):

1. Site description and evaluation of site contaminants.
2. Names of key personnel and alternatives responsible for site safety and health (responsibilities and chain of command).
3. Safety and health hazard assessment and risk analysis for each site task and operator (Accident Prevention Plan).
4. Education and training for all employees, name of person who will give the training and the topics covered.
5. Personnel protective equipment.
6. Medical surveillance.
7. Site control measures (work zones, communications and security).
8. Emergency Response Plan.
9. Confined space entry.
10. Plans and dates for meetings with local community, including local, state, and federal agencies involved in the corrective action, as well as the local emergency squads and the local hospital.
11. A list of first aid and medical facilities including, location of first aid kits, names of personnel trained in first aid, a clearly marked map with the route to the nearest military and civilian medical facility, all necessary emergency phone numbers conspicuously posted at the job site.

12. A Spill Control and Countermeasures Plan which shall include contingency measures for spills and discharges from materials handling and/or transportation; a description of the methods, means, and facilities to prevent contamination of soil, water, atmosphere, uncontaminated structures, equipment, or materials by spills or discharges; a description of the equipment and personnel necessary to perform emergency measures to contain any spillage and remove spillage; and a description of the equipment and personnel to perform decontamination measures that may be required.

C. The site-specific CHSP shall be submitted to the Owner within at least 30 days prior to initiating work at the Site in accordance with the schedule established in the Contract Period, in an acceptable format form review and approval. No work shall commence at the Site prior to receipt of the compliance notification for the CHSP from the Owner.

D. Should any unforeseen, site-specific, safety-related factor, hazard, or condition become evident during the performance of work at the Site, the Contractor shall be responsible to immediately verbally notify the Owner and/or Owner's Representative and notify the Owner in writing within 24 hours. The contractor shall submit a report to the Owner within 10 days. In the interim, the Contractor shall take prudent action to establish and maintain safe working conditions and to safeguard employees, the public, and the environment.

E. Should the Contractor seek relief from, or substitution for, any portion or provision of the CHSP, such relief or substitution shall be requested of the Owner in writing, and if approved, be authorized in writing.

F. The CHSP developed by the Contractor shall include provisions for work related to initial site preparation prior to implementation of the facilities described in the specifications. It shall be the responsibility of the Contractor to conduct whatever testing or monitoring is deemed necessary to assure a safe operation during the initial site preparation work.

1.06 EMERGENCY RESPONSE AND CONTINGENCY PROCEDURES

A. As part of the CHSP, the Contractor shall develop and submit to the Owner emergency response and contingency procedures for on-site and off-site emergencies in accordance with OSHA 20 CFR 1910.120(q). The types of emergencies anticipated during site activities and coordination with outside emergency responders shall be addressed.

B. In the event of any emergency associated with remedial action, the Contractor shall, without delay, take diligent action to remove or otherwise minimize the cause of the emergency; alert the Owner and/or Owner's Representative and implement whatever measures might be necessary to prevent any repetition of the conditions or actions leading to, or resulting in, a similar emergency.

C. In the event that an accident or some other incident such as an explosion, a theft of any hazardous material, or an exposure to toxic chemical levels occurs during the course of the project, the Owner and/or Owner's Representative shall be i) verbally informed immediately, and ii) notified in writing with 24 hours of the event. Within 10 days of the event, a report shall be submitted to the Owner.

D. Contractor's Emergency Response Plan shall be regularly rehearsed. The plan shall also be compatible, and integrated with the disaster, fire, and/or emergency response plans of local, state, and federal agencies. The plan shall be periodically reviewed and amended to keep current with new or changing site conditions or information.

E. The Contractor shall notify the Base Fire Department prior to beginning the on-site burning of clearing debris. The Contractor shall communicate and coordinate the emergency fire response that may be necessary during the on-site burning of clearing debris.

F. An employee alarm system shall be installed in accordance with 29 CFR 1910.165 to notify site personnel of an emergency situation; to stop work activities if necessary.

G. Spill Control:
   1. The Contractor shall provide means, methods, and facilities to prevent further contamination of the soil, water, and atmosphere caused by spills of contaminated materials which will be handled as a result of the Contractor's operations.
   2. The Contractor shall provide equipment and personnel necessary to contain and remove any on-site and off-site spills. The collected contaminated materials shall be disposed of in accordance with the Emergency Response Plan spill control section.
   3. The Spill Control Section of the Emergency Response Plan shall include the following:
      a. The availability, location, and amounts of spill control including names of individuals, type of instruction, and on-site staffing levels.
      b. Details of training of personnel in spill control including names of individuals, type of instruction, and on-site staffing.
      c. Contingency plan for on-site spills including procedures for mobilizing equipment and personnel, estimates of response time to containment, methods of disposal of spill residues, and list of disposal sites.
      d. Contingency plan for transportation-related spills.
      e. Spill control organization including names and telephone numbers of individuals who are on 24-hour standby and responsibilities of individuals within the organization.
      f. List of federal, state, and local agencies to be notified in the event of an off-site spill and the names of individuals on the Contractor's staff authorized to make emergency notifications.

1.07 SITE CONTROL

A. Work zones shall be designated by the Contractor for all project work areas and presented in the CHSP. The Contractor shall clearly lay out and identify these zones in the field and shall limit equipment, operations, and personnel in the zones as required by these specifications and described in the EPA Standard Operating Guidelines.

B. Communications: The Contractor shall provide telephone communication at the Contractor's site field offices. Emergency numbers, including police, fire, ambulance, hospital, and EPA, shall be prominently posted near the telephone.

1.08 LOGS, REPORTS, AND RECORDKEEPING

A. The Contractor shall maintain logs and reports covering the implementation of the CHSP, including the employee's/visitor's log. The format shall be developed by the Contractor to include daily logs and a phase-out report.

B. Daily Safety Logs:
   1. Date.
   2. Employees in a particular area.
   3. Equipment being utilized by employees.
   4. Protective clothing being worn by employees.
   5. Protective devices being used by:
      a) Contractor's personnel
      b) Visitors
      c) Designated state and federal representatives
      d) Owner
   6. Site safety and health officer signature and date.

C. Employee's and Visitor's Log:
   1. Date.
   2. Name.
   3. Address.
   4. Representing agency or company.
   5. Time entering the Site.
   6. Time exiting the Site.

D. Employer Obligation: The Contractor shall be aware that Federal laws such as OSHA (29 CFR) require that chemical exposure records, medical records, and accident reports be maintained by employer for a specified length of time after the termination of the job, but no less than 7 years.

E. Manifests: The Owner will provide a representative to sign all manifests for disposal of hazardous materials generated during the execution of the Work.

1.09 EQUIPMENT DECONTAMINATION

A. All vehicles and equipment that may encounter hazardous waste during the corrective action shall be decontaminated in the Contamination Reduction Zone prior to entering the Support Zone.

B. The Contractor shall be responsible for monitoring decontamination of all vehicles exiting the Exclusion Zone.

C. The Contractor shall transfer the collected water from the storage tanks to an Owner-approved off-site wastewater treatment plant.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01065

SECTION 01200

PROJECT MEETINGS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. This section covers the requirements for project meetings during the initiation and execution of the Work.

B. Attendees: Unless otherwise specified or required by the Owner, the meetings shall be attended by the Owner and/or the Owner's Representative, U.S. Environmental Protection Agency (EPA, as necessary), Mississippi Department of Environmental Quality (MDEQ, as necessary), and the Contractor and his Superintendent. Subcontractors may attend when involved in the matters to be discussed or resolved but only when requested by the Owner, or the Contractor.

C. Meeting Records: The Contractor shall record the minutes of each meeting and shall furnish copies to the Owner and the Owner's Representative within 5 working days thereafter. If the Owner and the Owner's Representative does not submit written objection to the contents of such minutes within 7 working days of receipt, it shall be understood and agreed that the Owner and the Owner's Representative accept the minutes as a true and complete record of the meeting.

D. Meeting Schedule: The dates, times, and locations for the various meetings shall be agreed upon and recorded at the preconstruction conference. Thereafter, changes to the schedule shall be by agreement between the Owner and the Contractor, with appropriate written notice to all parties involved.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 PRECONSTRUCTION CONFERENCE

A. A preconstruction conference shall be held at Keesler AFB, Mississippi, following the selection of the Contractor and contract execution. The conference shall be attended by the Owner, Owner's Representative, and the Contractor. The conference may also be attended by EPA and MDEQ.

B. Execution and Submittal of Documents: At the preconstruction conference, unless otherwise specified or agreed by the Owner and the Contractor, the Contractor shall present to the Owner the work schedule and all other preconstruction documents required by the Contract Documents.

C. Agenda: In general, the matters to be discussed or resolved and the instructions and information to be furnished to or given by the Contractor at the preconstruction conference include:

1. Project meeting schedule.
2. Construction schedule.
3. Communication procedures between the parties.
4. The names and titles of all persons authorized by the Contractor to represent and execute documents for the Contractor, with samples of all authorized signatures.
5. The names, addresses, and telephone numbers of all those authorized by the Contractor to act for the Contractor in emergencies.
6. Construction permit requirements, procedures, and posting.
7. Procedures concerning the installation of the project facilities.
8. General construction and procedures.
9. Access furnished by the Owner.
10. Forms and procedures for Contractor's submittals.
11. Change Order and Field Order forms and procedures.
12. Payment application forms and procedures and the revised progress schedule reports to accompany the applications.
13. Contractor's Construction Health and Safety Plan (CHSP) and designation of the Contractor's Safety Officer and his qualifications.
14. First-aid and medical facilities to be furnished by the Contractor.
15. Contractor's provisions for barricades, traffic control, utilities, sanitary facilities, and other temporary facilities and controls.
16. Distribution and instructions on Owner furnished Documents and Plans.
17. Testing laboratory or agency, and testing procedures.
18. Construction equipment and methods proposed by the Contractor.
19. General security and safety.
20. Procedures for payroll and labor cost reporting by the Contractor.
21. Procedures to ensure nondiscrimination in employment on and for the Work.
22. Issuance of the Notice to Proceed.
23. Other administrative and general matters as needed.

D. Site reconnaissance to verify that the design criteria and the plans and specifications are understood and specifications are understood and locations of major facilities are adequate.

3.02 WEEKLY PROGRESS MEETINGS

A. The progress meetings will be held at the Site during the performance of the Work on a regular basis in accordance with the agreed schedule. During all phases of the work, meetings will be held on a weekly basis. All matters bearing on the progress and performance of the work which have occurred since the preceding progress meeting shall be discussed and resolved, including without limitation any previously unresolved matters, deficiencies in the work or the methods being employed for the work, and problems, difficulties, or delays which may be encountered.

B. The progress meetings will be attended by the Owner, Owner's representative, and the Contractor's Site Superintendent. Subcontractors may attend when matters pertaining to the subcontractor's work are to be discussed or resolved. Subcontractor shall attend the meeting only when so requested by the Owner, Owner's representative or the Contractor.

3.03 QUARTERLY PROGRESS MEETING

A. The Owner will coordinate and conduct quarterly meetings with regulatory agencies. The initial Quarterly Meeting will be held within two (2) months of the Preconstruction Conference (Subpart 3.01) and will continue throughout the duration of the Work. Additional individuals will attend the meeting at the request of the Owner. The Contractor will be required to attend Quarterly Progress Meetings when requested by the Owner. The Quarterly Progress Meetings will either be held at Keesler Air Force Base or in Biloxi, Mississippi.

B. Topics to be covered during the progress meetings will include:
   1. Work completed to date;
   2. Delays, problems, and recovery schedules;
   3. Activities planned for the next quarter; and
   4. Community relations.

3.04 MILESTONE MEETINGS

A. Milestone meetings will be conducted at the completion of the major phases of the Work. The meetings will be held to discuss project activities conducted in completion of the subject milestone, subsequent work milestones, associated activities, and schedule. At a minimum, milestone meeting will include the following:
   1. Preconstruction Conference (as discussed in Subpart 3.01);
   2. Completion of Landfill Cover System Subgrade Grading;
   3. Completion of Storm Drain Installation;
   4. Completion of Landfill Cover System Installation; and
   5. Completion of Final Grading, Landscaping and Golf Course Construction.

3.05 OTHER MEETINGS WITH REGULATORY AGENCIES

A. When requested, the Contractor shall attend additional meetings held or required by regulatory agencies. The meetings will be held at the Site or in Biloxi, Mississippi.

3.06 PREFINAL CONSTRUCTION CONFERENCE

A. A prefinal construction conference shall be held prior to final inspection of the Work to discuss and resolve all unsettled matters and outstanding construction items including but not limited to those identified in the Prefinal Construction Inspection. The Bonds and insurance to remain in force, and the other documents required to be submitted by the Contractor will be reviewed and any deficiencies determined. Schedules and procedures for the final inspection process, and for correction of defects and deficiencies, shall be discussed and agreed upon by all parties. The Prefinal Construction Conference will be held at the Site.

END OF SECTION 01200

SECTION 01300

SUBMITTALS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Requirements and procedures necessary for scheduling, preparation, and submission of submittals are specified in this section.

1.02 RELATED WORK SPECIFIED UNDER OTHER SECTIONS

A. Individual specification sections may contain additional and special submittal requirements. Individual sections shall take precedence in the event of a conflict with this section. All reports, plans, submittals, and items are subject to the review and approval by the Owner or Owner's Representative and may be subject to review and approval by EPA and Mississippi Department of Environmental Quality (MDEQ).

1.03 SUBMITTAL PROCEDURES

A. The Owner reserves the right to modify the procedures and requirements for submittals, as necessary to accomplish the specific purpose of each submittal. The Contractor shall direct inquiries to Owner's Representative regarding the procedure, purpose, or extent of any submittal.

B. After checking and verifying all field measurements, make submittals for review to Owner or Owner's Representative.

1. Submittals shall bear a stamp or specific written indication by the Contractor that the submittal has been checked and is in accordance with the requirements of the Contract Documents. Submittals shall also contain the following certification signed by the Contractor, "I certify that the information contained in or accompanying this (report, plan, submittal, or item) is true, accurate, and complete. As to (the) (those) identified portion(s) of this (report, plan, submittal, or item) for which I cannot personally verify (its) (their) truth and accuracy, I certify as the Contractor's official having supervisory responsibility for the person(s) who, acting under my instructions, made the verification, that this information is true, accurate, and complete." All areas not in conformance or which differ shall be highlighted or otherwise noted.
2. Data shown shall be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data and in sufficient detail to enable the Owner, Owner's Representative, and EPA to review the information.

C. All submittals shall be accompanied with specific written indication that the Contractor has satisfied the requirements of the Contract Documents with respect to review of submittals, and identify clearly as to material, supplier, pertinent data such as catalog numbers and the intended use.

D. Before submission of each submittal, the Contractor shall determine and verify quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers, and similar data with respect thereto; review and coordinate each submittal with other submittals, requirements of the project, and the Contract Documents.

E. At the time of each submission, the Contractor shall give the Owner's Representative specific written notice of each variation that the submittal may have from the requirements of the Contract Documents. In addition, the Contractor shall make specific notation on each shop drawing submitted to the Owner's Representative for review and approval of each such variation.

F. The Owner's Representative's review of submittals shall not relieve the Contractor from responsibility for any variation from the requirements of the Contract Documents unless the Contractor has, in writing, noted to Owner's Representative attention each such variation at the time of submission, and Owner's Representative has given written approval of each such variation by a specific written notation thereof incorporated in or accompanying the shop drawing or sample approval; nor shall any approval by Owner's Representative relieve the Contractor from responsibility for errors or omissions in shop drawings or from responsibility for having complied with provisions herein.

G. Where a shop drawing or sample is required by the Contract Documents, related work performed prior to Owner's Representative's review and approval of pertinent submission shall be sole expense and responsibility of Contractor.

H. Timely prosecution of all work, including all submittals required herein or other individual specifications, shall be the sole responsibility of the Contractor. It is understood and agreed that the Contractor shall be solely responsible for corrective actions and all costs incurred due to the Contractor's failure to expeditiously prosecute the Work including the submittals.

1.04 ADMINISTRATIVE SUBMITTALS

A. The Contractor shall provide administrative submittals required by the Owner and the Contract Documents.

B. During performance of the Work, the Contractor shall maintain on a daily basis, and submit to the Owner and/or Owner's Representative full and correct information as to the number of persons employed in connection with each subdivision of the Work as well as their specific job classification; and the source, and amount of each class of materials delivered, equipment received, and major construction equipment used in each subdivision of the Work.

1.05 SCHEDULES

A. The Contractor shall submit a construction schedule for the Owner's review and approval as specified in Section 01310 – PROGRESS SCHEDULES.

1.06 SHOP DRAWINGS

A. General:

1. Shop drawings, as defined herein, consist of all drawings, diagrams, illustrations, schedules, and other data which are specifically prepared by or for the Contractor to illustrate some portion of the Work; and all illustrations, brochures, standard schedules, performance charts, instructions, diagrams, and other information prepared by a manufacturer and submitted by the Contractor to illustrate material or equipment for distinct portions of the Work.
2. Submittal of incomplete or unchecked shop drawings will not be accepted. Shop drawing submittals that do not clearly show the Contractor's review stamp or specific written indication of the Contractor's review will be returned to the Contractor unreviewed.
3. Submittal of shop drawings not required by the Contract Documents and not shown on the schedule of submittals will be returned to the Contractor unreviewed by the Owner's Representative.
4. Shop drawing submittals processed by the Owner's Representative do not become parts of the Contract Documents and are not Change Orders; the purpose of shop drawing review is to establish a reporting procedure and is intended for the Contractor's convenience in organizing the Work and to permit the Owner's Representative to monitor the Contractor's progress and understanding of the design.

B. Procedures:

1. The Contractor shall submit to the Owner's Representative for review and approval in accordance with the accepted schedule of submittals, three copies of each shop drawing.
2. The Contractor shall combine submittals specified in each Specifications section into a single package. Partial packages will not be reviewed until all submittals required for the section have been received.
3. The Contractor shall transmit each submittal on a form acceptable to the Owner or Owner's Representative.
4. The Contractor shall sequentially number the transmittal forms; resubmittals to have original number with an alphabetic suffix.
5. The Contractor shall identify project, Contractor, Specifications section number, pertinent drawing sheet and detail number(s), products, units and assemblies, and the system or equipment identification or tag number as shown.
6. The Contractor shall apply Contractor's stamp, signed or initialed certifying that review, verification of products required, field dimensions, adjacent construction work, and coordination of information, is in accordance with requirements of the Contract Documents.

7. The Contractor shall revise and resubmit submittals as required; identify all changes made since previous submittal.
8. The Owner and/or Owner's Representative will review and return submittals from the Contractor no later than 10 working days after receipt by the parties.
9. When shop drawings have been reviewed by the Owner and/or Owner's Representative, one copy will be returned to the Contractor appropriately annotated.
    a. If major changes or corrections are necessary, shop drawing may be rejected and one set will be returned to the Contractor with such changes or corrections indicated.
    b. The Contractor shall correct and resubmit the shop drawings in the same manner and quantity as specified for the original submittal. If changes are made by the Contractor, in addition to those requested by the Owner and/or Owner's Representative, the Contractor shall note and explain those changes on the resubmittal.

C. Foreign Manufacturers: The Contractor shall submit names and addresses of companies within the United States that maintain technical service representatives for all products supplied by foreign manufacturers. Include a complete inventory of spare parts and accessories for each foreign-made item proposed for incorporation into the Work.

D. Interfacing Work: Where called for in the Contract Documents, and as determined necessary by the Owner, to provide proper correlation with other work, the Contractor shall complete interface information. This interface information shall be accurate and contain all information necessary to allow for manufacturing and construction of interfacing or connecting work.

1.07 SAMPLES AND TEST SPECIMENS

A. Where required in the Specifications, and as determined necessary by the Owner or Owner's Representative, the Contractor shall submit test specimens and samples of materials, appliances, and fittings to be used or offered for use in connection with the Work. Include information as to their sources and submit such quantities and sizes for proper examination and tests to establish the quality or equality, thereof, as applicable.

B. The Contractor shall submit samples and test specimens in ample time to enable the Owner or Owner's Representative to make tests or examinations necessary, without delay to the Work.

C. The Contractor shall submit two additional samples as required by the Owner or Owner's Representative to ensure equality with the original approved sample and/or for determination of compliance.

D. Tests required by the Owner to be performed by an ITL shall be made by a laboratory licensed or certified in accordance with the statutes of the State of Mississippi.

E. The ITL shall provide written results of the laboratory tests to the Owner within 48 hours of the completion of the test.

1.08 QUALITY CONTROL SUBMITTALS

A. Manufacturer's Certification of Proper Installation: Where manufacturer's certification is required in the Specifications, the manufacturer shall provide certification stating the following:

1. The product or system has been installed in accordance with manufacturer's recommendations.
2. The product or system has been inspected by a manufacturer's authorized representative. The product or system has been serviced with the proper lubricants.
3. Applicable safety equipment has been properly installed.
4. Proper electrical and mechanical connections have been made.
5. Proper adjustments have been made and the product or system is ready for functional testing, plant startup, and operation.

B. Certification of Compliance:

1. Where specified, furnish certification of compliance for products specified to a recognized standard code prior to the use of such products in the Work.
   a. Certifications shall be signed by the manufacturer of the product; state that components involved comply in all respects with the requirements of Specifications.
   b. Furnish Certification of Compliance with each lot delivered to the jobsite and clearly identify the lot so certified.
2. Products used on the basis of Certification of Compliance may be samples and tested at any time. The fact that a product is used on the basis of Certification of Compliance shall not relieve the Contractor of responsibility for incorporating products in the work that conforms to requirements of the specifications set forth herein and on the Drawings. Products not conforming to such requirements will be subject to rejection whether in-place or not.
3. The Owner or Owner’s Representative reserves the right to refuse permission for use of products on the basis of a Certification of Compliance.

C. Functional Test Certification: Where a certification of functional testing is specified for certain equipment, the Contractor shall state in writing that:

1. Necessary hydraulic structures, piping systems, valves, pumps, and electrical (and control) systems, have been successfully tested.
2. Necessary equipment systems and subsystems have been checked for proper installation, started, and successfully tested to indicate they are operational.
3. Adjustments and calibrations have been made.
4. The systems and subsystems are capable of performing their intended functions.
5. The facilities are ready for performance testing, or for startup and intended operation, as applicable.
6. The manufacturer has reviewed and acknowledged this certification. Where several manufacturers have furnished equipment in a system, obtain each manufacturer’s review and acknowledgement of its respective equipment as part of a functional test for the overall system.

D. Performance Test Reports: Prepare and submit performance test reports where specified for equipment and systems.

1.09 OPERATIONS SUBMITTALS

A. The Contractor shall provide the following submittals:

1. Contractor's Site Operations Plan shall describe the resources, procedures and processes for performing the Work, including but not limited to:

a. Table of Contents;

b. Construction schedule in accordance with Section 01310 - PROGRESS SCHEDULES;

c. Operating hours for construction activities;

d. Procedures for controlling construction water, decontamination water, storm water, sediment, and erosion;

e. Procedures for waste loading, transportation, and disposal;

f. Excavation safety procedures and equipment requirements;

g. Demolition procedures;

h. Site clearing procedures;

i. Plans for Initial Site Preparation as described in Section 01010 – SUMMARY OF WORK;

j. Equipment and procedures for storm drain installation;

k. Equipment and procedures for subgrade placement;

l. Equipment and procedures for grading;

m. Equipment and procedures for the installation of methane collection system;

n. Equipment and procedures for geosynthetic clay liner placement;

o. Equipment and procedures for the installation of irrigation system;

p. Equipment and procedures for landscaping the finished cover and other related structures;

q. Equipment and procedures for installation of monitoring wells;

r. Inspection and reporting procedures; and

s. Description of organization, responsibility, and communication matrix for the Contractor.

2. The Contractor shall provide photographs in color showing the pre-construction site, construction progress, and the post-construction landfill site. The photographer shall be equipped to take exterior photographs. All film handling and development shall be done by commercial laboratories. The film shall be 35 mm format and indicated on the front of each print shall be the time and date. Job title and brief description of the photograph and location where photograph was taken shall be shown on the back of each photograph. Two 4-inch by 6-inch glossy prints of each exposure, together with all negatives, shall be delivered to the Owner's Representative.

a. 72 exposures shall be taken of the pre-construction site. Particular emphasis should be directed to structures on the site, or as directed by the Engineer.

b. 36 exposures shall be taken monthly showing the progress of construction. The location of these photographs shall be coordinated with the Owner's Representative.

c. 72 exposures shall be taken of the overall post-construction site and facilities.

3. Construction progress reports on a weekly basis, unless otherwise required more frequently by the Owner or Owner's Representative.

4. The Contractor shall prepare and submit a Hurricane Preparedness Plan to describe the responsibilities of the personnel, normal and emergency operating procedures, hurricane preparedness responsibility checklist, emergency phone numbers, and emergency evacuation routes and information.

1.10 PROJECT CLOSE-OUT SUBMITTALS

A. See Section 01700 – CONTRACT CLOSE-OUT and Section 01020 – AS-BUILT DRAWINGS:

B. Submit complete sets of reproducible final shop drawings before, or at the time of, delivery of equipment to the Site.

C. Deliver service records maintained on each item of equipment, prior to final acceptance of the project.

PART 2 - PRODUCTS (NOT USED).

PART 3 - EXECUTION (NOT USED).

END OF SECTION 01300

SECTION 01310

PROGRESS SCHEDULES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. The Work in this section includes progress schedule procedures, format and submittals.

1.02 SUBMITTALS

A. Submit the following items as specified in this section:
   1. Overall Schedule
   2. Network Diagrams
   3. Schedule Reports
   4. Progress Reports

B. Time of Submittals. Within thirty (30) working days after Notice to Proceed, Contractor shall submit to the Owner a network diagram describing the activities to be accomplished in the project and their dependency relationships, (predecessor/successor) as well as a tabulated overall schedule as herein defined. The overall schedule produced and submitted shall indicate a project completion date the same as the contract completion date. The Owner will meet with a representative of Contractor to review the proposed diagram and schedule.

C. Within ten (10) working days after the conclusion of the Owner's review period, Contractor shall revise the network diagram as required and resubmit the network diagram and a tabulated overall schedule produced there from. The revised network diagram and tabulated overall schedule shall be reviewed and accepted or rejected by the Owner within fifteen (15) working days after receipt. The network diagram and tabulated overall schedule when accepted by the Owner shall constitute the project Work schedule unless a revised schedule is required due to substantial changes in the Work scope, a change in contract time, or delinquency by Contractor requiring an acceptable Owner approved recovery schedule.

D. Acceptance: The finalized overall schedule will be acceptable to the Owner as providing an orderly progression of the Work to completion in accordance with the Contract requirements. Such acceptance will neither impose on the Owner or Owner's Representative responsibility for the progress or scheduling of the Work nor relieve Contractor from full responsibility therefor. The finalized overall schedule of shop drawing submittals will be acceptable to the Owner as providing a workable arrangement for processing the submittals in accordance with the requirements. The finalized overall schedule of values, as applicable, will be acceptable to the Owner or Owner's Representative as to form and content. When the network diagram and tabulated overall schedule have been accepted, Contractor shall submit to the Owner five (5) copies of all schedule information.

1.03 CONSTRUCTION SCHEDULE RESPONSIBILITIES

A. The Contractor shall be responsible for scheduling all work.

1.04 PROGRESS OF THE WORK

A. The Contractor shall execute the Work with such progress as necessary to complete the Work within the schedule specified in the contract period, and to prevent delay to the overall completion of the project.

B. The Contractor shall execute the Work at such times and on such parts of the project, and with such forces, materials, and equipment, to assure completion in the time established by the approved overall schedule.

1.05 OVERALL SCHEDULE

A. General:
   1. Contractor shall prepare and submit to the Owner an Overall Schedule of tasks required to perform the Work defined by these specifications or required for completion of project.
   2. Overall Schedule shall indicate the sequence of work and the time of starting and completion of all work activities. The schedule will include allowance for rain delays based on a 10-year average, as recorded by rain gauging stations located in Biloxi, Mississippi. Activities shall include, but not be limited to, the following items:
      a. Each subcontractor's items of work.
      b. Submission of required pre-construction submittals, Owner review and comment, return to Contractor and resubmission of submittal to Owner with comments addressed.
      c. Material and equipment order, manufacture, delivery, installation, and checkout.
      d. Mobilization.
      e. Demolition.
      f. Site preparation (as defined in the Summary of Work), installation of utilities, and installation of temporary structures/areas.
      g. Fill placement and grading of the landfill surface.
      h. Construction of storm drains.
      i. Gas Venting Layer placement.
      j. Placement of GCL.
      k. Golf Course Landscaping and related structures.
      l. Demobilization.
      m. Project completion.

B. Network Diagram:

1. Contractor shall submit a time-scaled critical path method (CPM) network diagram. Draw or print the network diagram on reproducible paper, not larger than 30 inches by 42 inches, and show the sequence and interdependence of activities required for complete performance of all items of the Work.
2. Produce a legible and accurate diagram. Group activities related to a specific physical area of the project for ease of understanding and simplification. Label each activity with a complete description as well as estimated duration in working days.
3. Activity durations shall be not less than 1 day or more than 15 working days for specific discreet tasks, unless otherwise approved by the Owner, except material and equipment fabrication delivery.
4. Information on the network diagram shall be maintained current by the Contractor at all times. The "critical path" of activities will be indicated on the network diagram by a heavy line, highlighting, or other means to allow quick recognition.
5. Float developed through a difference between the project's schedule completion data and the contractually required completion date will belong to the project and not to the parties of the Contract. The Contractor shall not artificially extend an activity to reduce or eliminate float (either shared or free).
6. A work responsibility listing shall be prepared by the Contractor which shall segregate the Work activities for the Contractor, subcontractors, and all major items of material and equipment for which submittals to the Engineer are required. All activity lists and schedule reports shall include an activity identification, activity description, duration, responsibility code/indicator, percent complete, early start (scheduled or actual), early finish (scheduled or actual), late start, late finish, and total float. Variations to list formats or procedures are subject to review by the Engineer.

C. Schedule Reports:

1. Prepare schedule listings of the information in the network diagram in tabular format, sorted according to:
   a. Early-start, within responsibility.
   b. Early-start.
   c. Activity number sequence.
   d. Activity number sequence with predecessor and successor activity.
2. Schedule listings shall show activity numbers, description, responsibility, total duration in work days, percent complete, early-start date, late-start date, early-finish date, and total float for each activity in the network diagram.
3. Overall Schedule and subsequent revisions shall reflect actual progress of the project to within 10 working days prior to submittal. The Contractor shall sign and submit one reproducible and three copies of the initial Overall Schedule and each revision.

D. Progress Reports:

1. Weekly progress meetings will be held between the Contractor, the Owner, and the Owner's Representative at which time the schedule will be reviewed. Prior to the meeting, Contractor shall obtain the necessary information to update the Overall Schedule to reflect progress to date. Furnish sufficient copies of the updated schedule at the meeting for review.
2. In updating the schedule, progress will be reviewed:
    a. To identify those activities started and completed during the previous period.
    b. For remaining duration, from the date of update, required to complete each activity started but not completed.
    c. For review of remaining duration for selected activities not yet started.
    d. For addition of proposed sequencing changes to the network diagram and schedule listings.
3. At least once each month, and utilizing data accumulated during previous joint Owner-Contractor reviews, Contractor shall revise network diagram and generate updated overall schedule reports. Also, revise and submit network diagram and schedule reports when one of the following conditions occurs:
    a. Delay in completion of a work item or sequence of work items causes an estimated extension of project completion by ten (10) or more working days.
    b. Delays in submittals, deliveries, or work stoppages are encountered which require replanning or rescheduling of work.
    c. Schedule no longer represents actual execution and progress of the Work.
4. Whenever revised scheduling documents are submitted, they shall be accompanied by a written narrative report. The narrative report shall:
    a. Describe amount of progress since the last revision in terms of activities started, continuing, and completed.
    b. Describe problem areas, current and anticipated delay factors, and their estimated impact on performance of other activities and completion dates.
    c. Explain corrective action taken or proposed.

E. Recapture of Current Schedule:

1. If at any time during the project, the Contractor fails to complete an activity by its latest scheduled completion date, which late completion will extend the end date of the work past the specified completion date by more than ten (10) days, the Contractor shall within seven (7) calendar days submit plans to reorganize the work force to return to the current overall schedule.
2. The Owner may require the Contractor to add to plant, equipment, or construction forces, as well as increase working hours, if operations fall behind schedule at any time. The Contractor shall be responsible, at no cost to the Owner, for all expenses incurred by the Contractor including but not limited to expenses for providing all necessary labor, materials, and equipment to recapture current schedule.
3. The Contractor shall plan, schedule, and coordinate construction operations and activities in a manner that will facilitate progress of the Work.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01310

SECTION 01402

CONSTRUCTION QUALITY ASSURANCE/ QUALITY CONTROL PLAN

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. This section describes the requirements for the Construction Quality Assurance/Quality Control (QA/QC) Plan.

1.02 DESCRIPTION

A. The Construction QA/QC Plan will provide the testing and documentation procedures necessary to ensure, with a reasonable degree of certainty, that the Landfill 3 cover construction is performed in accordance with the design criteria, plans and specifications, and the performance standards.

1.03 SUBMITTALS

A. The Owner's Representative shall prepare and submit a Construction QA/QC Plan to the Owner for approval. The Owner's Representative shall also be responsible for addressing EPA's, Mississippi DEQ's, and the Owner's review comments, and updating the Construction QA/QC Plan.

1.04 CONSTRUCTION QUALITY ASSURANCE/QUALITY CONTROL PLAN AND PROCEDURES

A. General: The Plan shall contain a description of the quality assurance objectives for the construction activities, the quality assurance and quality control procedures, a description of the project organization, and the responsibility of key individuals.

B. The Contractor's work shall conform to the requirements of the Construction QA/QC Plan.

C. The Owner's Representative will provide a Construction Quality Assurance Officer (CQAO). The CQAO will perform the following tasks:

1. Perform audits and inspections of the Landfill 3 cover construction at the Site.
2. Inform the Owner or Owner's Representative of any deficiencies discovered during the construction quality assurance audits or inspections.
3. Verify that the corrective action is implemented.

D. The Contractor will be notified of deficiencies found during the construction quality assurance audits or inspections. The Contractor shall submit a corrective action plan for the Owner's and/or Owner's Representative's review. The Contractor shall implement the corrective actions after the plan is approved by the Owner and/or Owner's Representative.

E. Respond constructively within three business days to any quality assurance/quality control issues identified or information requests by the CQAO. Provide information and documentation requested by the CQAO.

F. External audits may be conducted by the regulatory agencies. The regulatory agencies will determine the number of external audits and scope to be performed, individuals to perform the audits, and time and place of audits.

G. Preparatory inspections will be performed by the CQAO prior to starting any task which has control requirements. Where more than one definable task is included in a work action, a preparatory meeting may be appropriate to discuss the separate features of the work item. The Contractor and any Subcontractor involved with the task shall attend the Preparatory Inspection Meetings. The CQAO will organize and run the Preparatory Inspection Meetings.

H. The Contractor's document control and reporting procedures shall conform to the Construction QA/QC Plan.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01402

SECTION 01410

TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. This section describes the Contractor engaged Independent Testing Laboratory (ITL) services for the testing of asphalt, fill material, geosynthetic clay liner, geonet, and geotextiles during the performance of the Work.

1.02 SUBMITTALS

A. The ITL will submit laboratory test results to the Owner and Owner's Representative Contractor within 48 hours after completion of the test.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

A. The geotechnical and analytical laboratories shall be contracted by the Contractor and will report results to the Owner and Owner's representative within the time constraints listed in Subpart 1.02 of this section.

B. The Contractor shall be responsible for all the inspection and testing costs. The Contractor shall bear the cost of retesting and reinspecting all work that fails to conform to requirements set forth in the Specifications and as shown on the Drawings.

END OF SECTION 01410

SECTION 01500

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. This section covers requirements for provision, maintenance, and removal of temporary on-site facilities necessary to perform the Work. The Contractor shall provide temporary facilities including but not limited to field offices, personnel and equipment decontamination facilities, construction fencing, site security, and utilities required to perform the Work.

1.02 REQUIREMENTS OF REGULATORY AGENCIES

A. The Contractor shall make all necessary arrangements, secure all required permits, and pay all fees and charges associated with obtaining, installing, maintaining, and removal of the facilities and controls as required by local, state, and federal authorities.

1.03 SUBMITTALS

A. Drawings and Data: Contractor shall submit the following shop drawings, catalog data, brochures, material lists, and other data for all temporary support and process facilities in accordance with Section 01300 - SUBMITTALS:

B. Temporary Utility Submittals
   1. Electric power supply and distribution plans.
   2. Water supply and distribution plans.
   3. Telephone service supply and distribution plans.
   4. Copies of approval of local utility companies for Contractor's intended temporary utility plans.

C. Temporary Construction Submittals: Copies of survey notes taken to establish control points for structures affected by the work and layout of survey control points.

D. Temporary Control Submittals
   1. Copies of permits and approvals for construction from governing local, state, and federal agencies.
   2. Plan for disposal of waste materials, including permits from or agreements with the intended disposal authority.
   3. Plan of intended haul routes.

E. Safety, Protection, and Security Submittals: Safety requirements are described in Section 01065 - SAFETY, HEALTH, AND EMERGENCY RESPONSE REQUIREMENTS.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 CONSTRUCTION UTILITIES

A. Contractor shall furnish all material and services necessary to distribute utilities described in Subparts 3.01 B., 3.01 C., 3.01 D., and 3.01 E., to locations where the Work is performed.

B. Power and Lighting

1. Power: Electric power is available for no additional fee to Contractor. The Contractor shall determine, at his own expense, the type and amount of power available and make arrangements for obtaining all necessary additional electric service required for Contractor's operations under the Contract. The Contractor shall schedule all necessary arrangements for additional power supply such that no delay in the execution of the Work in accordance with the Contract Period occurs. The Contractor shall provide and maintain all temporary power lines required to perform the Work in a safe and satisfactory manner.
2. Construction Lighting: All Work conducted at night or under conditions of insufficient daylight shall be suitably lighted to ensure proper work and to afford adequate facilities for inspection and safe working conditions.
3. Approval of Electrical Connection: All temporary connections for electricity shall be subject to approval by the Owner and the power company representative and shall be removed in like manner at Contractor's expense prior to final acceptance of the Work.
4. Separation of Circuits: Unless otherwise permitted by the Owner, circuits separate from lighting circuits shall be used for all power purposes.
5. Construction Wiring: All wiring for temporary electric light and power shall conform to the requirements of Subpart K of the OSHA Standards for Construction.

C. Water Supply

1. General: Potable water shall be used for showers, equipment washdown, construction, and sanitary uses. The Contractor may use the existing water line at the Site at no cost. Should the Contractor deem the supply as inadequate, the Contractor shall arrange for delivery and storage of additional potable water requirements.
2. Contractor shall be solely responsible for the adequate functioning of Contractor's water supply system and solely liable for any claims arising from the use of same, including discharge, waste, or water therefrom.
3. Removal of Water Connections: Before final acceptance of the Work on the project, all temporary connections and piping installed by the Contractor shall be entirely removed, and all affected improvements shall be restored to their original condition or better and to the satisfaction of the Owner.

D. Sanitation

1. Toilet Facilities: Fixed or portable chemical toilets shall be provided wherever needed for the use by personnel onsite including the Owner's Representative, Contractor and Subcontractor personnel. Toilets at Site shall conform to requirements of Subpart D, Section 1926.51 of the OSHA Standards for Construction.
2. Sanitary and Other Organic Waste: All waste and refuse generated from sanitary facilities provided by Contractor, and trash from all field offices and any other source related to Contractor's operations shall be disposed of offsite in a manner satisfactory to the Owner and in accordance with all laws and regulations pertaining thereto. Disposal of all such waste shall be at the Contractor's expense.

E. Communications

Telephone Services: Contractor shall provide and maintain at all times during the progress of the Work, at Contractor's own expense, telephones in good working order at the Contractor's field office. Such telephone shall be connected to an established exchange for local and long distance service.

3.02 CONSTRUCTION AIDS

A. The Contractor shall comply with OSHA requirements and applicable laws, ordinances, rules, regulations, and orders pertaining to construction machinery and equipment, hoists, cranes, scaffolding, staging, materials handling facilities, tools, appliances, and other construction aids. OSHA requirements shall govern where mandatory; otherwise, comply with most stringent requirements.

3.03 ROADS AND PARKING

A. Transportation Facilities: Contractor shall make the necessary arrangements for delivery of materials to and from the Site. See Section 01620 - OFF-SITE TRANSPORTATION for additional information on the transportation of waste.

B. Access Road and Parking:

1. Contractor shall submit to the Owner an Access Roadway Plan as part of the Site Operations Plan, proposing the location and layout, and materials and methods of construction for the site access roads for use by the Contractor to perform the Work. Upon Owner's approval, the Contractor shall construct the site access roads in accordance with the approved Access Roadway Plan.
2. The area designated on the Drawings as the Parking Area shall be used as parking for the Contractor employee personnel and Owner's Representative.
3. Contractor shall maintain all roads and parking areas in good condition. Maintenance activities for the ingress and egress road, access roads, and parking areas shall include dust suppression to eliminate nuisance conditions and placement and compaction of gravel where damage or erosion has occurred. Also, Contractor shall maintain proper grade along and across roadway to minimize erosion or ponding.

3.04 CONSTRUCTION EQUIPMENT STAGING AREA

A. The Contractor shall use the areas designated by the Owner or Owner's Representative for equipment staging. The Contractor shall notify the Owner or Owner's Representative of obstructions not shown or readily apparent by visual inspection of the staging area. If such obstructions adversely affect Contractor's operations, relocation will be considered.

B. Materials such as pipe and geosynthetics shall be stored on pallets or racks, off ground, and in a manner to allow ready access for inspection and inventory.

C. See SECTION 01600 - MATERIALS AND EQUIPMENT for additional information regarding material and equipment handling and storage.

3.05 STORAGE BUILDINGS

A. The Contractor shall provide temporary storage buildings of various sizes as required to protect mechanical and electrical equipment and other materials, as recommended by manufacturers of such equipment and materials.

B. At the completion of the work, temporary storage buildings shall be dismantled and removed from the Site.

3.06 CONSTRUCTION FENCES

A. The Contractor shall erect a construction fence around the Site areas as shown on the Drawings to prevent access by unauthorized personnel and trespassers of construction ongoing at the Site.

B. The construction fence shall be orange color, high-visibility safety fencing made from ultra-violet stabilized, high-density polyethylene.

C. The Contractor shall post warning signs on the fence and the gate in accordance with local, state, and federal requirements.

3.07 SITE SECURITY

A. The Contractor shall be responsible for the security of all materials, equipment, instruments and all other items on the Site throughout the duration of the Work till the Owner accepts the completed Work.

3.08 SPECIAL CONTROLS

A. Noise Control: Comply with OSHA requirements for allowable noise levels during construction. Prevent noise disturbance to adjoining property owners and the public.

B. Dust Control: Refer to SECTION 02200 - EARTHWORK.

C. Water Control: Refer to SECTION 02700 - SITE DRAINAGE.

D. Air Pollution Control: Comply with all laws, ordinances, rules, regulations, and other restrictions pertaining to air pollution.

3.09 FIELD OFFICES

A. The Contractor shall install and maintain a minimum of two (2) field offices: one office for the Contractor and one office for the Owner/Owner's Representative. The field offices shall be located within the Operations Area as shown on the Drawings.

B. The field offices shall be as follows:
   1. Trailer-type mobile structures.
   2. The color of the field office trailers must be an off-white with brown trim or brown with white. Other colors such as blue, red, yellow, etc. shall not be allowed.
   3. Weather-tight, with lighting, electrical outlets, heating, cooling, and ventilating equipment, and equipped with office furniture.
   4. Provide separate space for project meetings with table and chairs to accommodate six persons.
   5. Each office trailer shall be complete with the following items of equipment and furniture:
      a. Two desks, steel with lock (36 in. by 60 in.), and one chair each.
      b. One, 36 in. by 60 in.drafting tables, and one stool.
      c. One vertical drawing file.
      d. Three legal size, four drawer filing cabinets with locks and keys, equipped with hanging folder system and 200 hanging folders. One of the cabinets shall be fireproof.
      e. One folding conference table (2 ft. by 8 ft.) with six chairs.
      f. One dry ink copy machine capable of reproducing 8 ½ by 11 inch, 8 ½ by 14 inch, and 11 by 17 inch plain paper sheets. Furnish and maintain one spare toner cartridge. Provide and pay for routine and on demand service and maintenance on this equipment for the life of the project.
      g. Non-cordless, two-line telephone with speaker phone and answering machine features. Furnish with 12-foot cord.
      h. Plain paper fax machine, inkjet or laser.
      i. One automatic defrost refrigerator having a minimum capacity of 3.6 cubic feet.
      j. Refrigerated bottled water dispenser. Dispenser shall use 5 gallon standard water jugs. A supply of at least 3 full water jugs shall be maintained at all times.
      k. One freestanding bookshelf/storage unit (18 in. by 26 in by 72 in. high) containing a minimum of six adjustable shelves.
      l. One battery operated, quartz regulated clock, minimum of 12 inch in diameter.
      m. Two steel wastebaskets, minimum of 6.5 gallon capacity.
      n. One eraser board (3 ft. by 4 ft.) with four different colored markers and eraser.
      o. First-aid kit.
      p. Carbon Dioxide (10 lb.) fire extinguisher.

C. Provide reasonable maintenance and janitorial service.

D. The field offices shall be available for use prior to the start of Work at the Site, and shall remain on the Site through completion of the project.

E. The Contractor shall provide a coarse aggregate rock base under and around the field offices. Installation of this coarse aggregate base shall comply with SECTION 02200 - EARTHWORK. The grade under the field offices shall be raised to a level where flooding will be avoided and storm drainage is directed away from the trailers.

F. The Contractor shall obtain and provide the field offices with sanitary facilities such as portable chemical toilets in compliance with state and local health regulations, requirements, and guidances. It is the responsibility of the Contractor to maintain the sanitary facilities in good condition at all times during the performance of Work.

G. The Contractor shall provide all equipment, materials and services necessary to collect, store and dispose all liquid and solid waste generated by the use of the field offices in accordance with all applicable state and local regulations and requirements.

3.10 REMOVAL OF CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

A. Remove construction facilities and temporary controls from the Site and where the Work is performed when no longer required. Clean up and restore areas occupied by temporary facilities to acceptable condition as determined by Owner or Owner's Representative.

END OF SECTION 01500

SECTION 01600

MATERIALS AND EQUIPMENT

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. This section covers material and equipment storage, handling, and protection.

1.02 QUALITY ASSURANCE

A. Contractor shall provide products, materials, or equipment of a singular generic kind and from a single source. The equipment shall be new and in good working condition.

1.03 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. The Contractor shall obtain the approval of Keesler Air Force Base prior to the delivery of products, materials, or equipment. The Contractor shall handle and store products in accordance with manufacturer's written recommendations and methods and means which will prevent damage, deterioration, and loss including theft. The Contractor shall submit to the Owner and Owner's Representative copies of all manufacturers' written instructions regarding the same. The Contractor shall control delivery schedules to minimize long-term storage of products at the Site and overcrowding of construction spaces. In particular, Contractor shall provide delivery/installation coordination to ensure minimum holding or storage times for products recognized to be flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other sources of loss. The Contractor shall identify product specifications and lead-time requirements, and procure all materials, equipment, products and all other items necessary to complete the Work in accordance with the Contact Documents, such that no construction delay or short-falls occur.

1.04 TRANSPORTATION AND HANDLING

A. Contractor shall transport products by methods to avoid product damage. Also, products shall be delivered in a dry and undamaged condition in manufacturer's unopened containers or packaging.

B. The Contractor shall provide equipment and personnel to handle products by methods that will prevent soiling and damage

C. Contractor shall provide additional protection during handling to prevent marring and otherwise damaging products, packaging, and surrounding surfaces.

1.05 STORAGE AND PROTECTION

A. Contractor shall store products in accordance with manufacturer's written instructions, with seals and labels intact and legible.

B. For exterior storage of fabricated products, Contractor shall place such products on sloped supports above ground. Products subject to deterioration shall be covered with impervious sheet covering.

C. Contractor shall arrange storage to provide access for inspection. Contractor shall periodically inspect to assure products are undamaged and maintained under required conditions.

D. Contractor shall arrange storage in a manner to provide access for maintenance and inspection of stored items.

1.06 EXTERIOR STORAGE

A. Contractor shall provide substantial platforms, blocking, or skids to support fabricated products above ground and shall slope to provide drainage. Products shall be protected from soiling and staining

B. Contractor shall provide for surface drainage to prevent erosion and ponding of water.

C. Contractor shall prevent mixing of refuse or chemically injurious materials and liquids.

PART 2 - PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01600

SECTION 01620

OFF-SITE TRANSPORTATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. This section describes the work necessary to transport any materials or waste from the Landfill 3, Keesler Air Force Base site to various off-site treatment and/or disposal facilities.

1.02 OWNER REQUIREMENTS

A. Provide off-site transportation and disposal of all waste generated by the execution of work activities to a designated, Owner-approved disposal facility.

B. Strictly follow the truck route the Owner has established for all truck traffic to and from the Site. It is understood and agreed that the Contractor shall have a $500.00 payment deduction for each instance of deviating from the established truck route not authorized by the Owner. This amount shall be deducted from the amount payable to the Contractor for the Work completed in accordance with the Agreement.

C. The Contractor, its subcontractors, or their employees shall not litter while on roadways traveling to and from the Site or while on the Site. The Contractor or its subcontractors shall strictly obey all posted speed limits while traveling on Base. In the case that a Contractor or its subcontractor is found littering or speeding on Base, the Contractor shall have a $200.00 payment deduction. This deduction will be charged for each occurrence.

D. Thoroughly investigate the quality and conditions of all public and private roads and of all clearances, restrictions, bridge load limits, and other limitations affecting transportation from the Site.

E. Originate and maintain the waste shipment manifests used by the EPA and the State where the disposal facility is located.

F. Provide vehicle decontamination facilities in accordance with Section 01500 – CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS and Section 01065 - SAFETY, HEALTH, AND EMERGENCY RESPONSE REQUIREMENTS.

G. Perform vehicle inspection for each vehicle before the vehicle leaves the Site.

H. Coordinating hauling with site work schedules and acceptance of loads at the disposal facility.

I. Weigh all waste loads designated for off-site disposal utilizing a portable truck scale installed on a level compacted surface and accurate to within 100 pounds.

J. Obtain base clearance for off-site transportation vehicles from the Owner.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 LOADING

A. Provide the equipment, personnel, and facilities necessary to handle and load materials designated for off-site disposal.

B. Control any nuisances and environmental hazards, such as dust, odors, or wind blown debris, at levels acceptable to the Owner.

C. Ensure that all operations in the loading of waste shall be in compliance with all appropriate federal, State, and local DOT regulations.

D. All waste materials shall be inspected by the Contractor prior to their transportation off the Site. Any vehicle that has material dripping or leaking in any quantity shall not be allowed to be removed from the Site. Water shall be transported from the Site in vehicles with water tight containers.

E. All vehicles leaving the exclusion zone for off-site disposal shall be decontaminated in accordance with Section 01065 - SAFETY, HEALTH, AND EMERGENCY RESPONSE REQUIREMENTS.

3.02 HAULING

A. Implement a hauling or transport schedule that does not result in any delays in the project schedule.

B. Any waste that is deemed hazardous by federal, state, or local regulations shall be disposed in a permitted landfill. Contractor shall obtain manifest forms, waste code numbers, and complete the waste shipment manifest records. The scaled weight of each load transported off-site shall be provided by the Contractor to the Owner. The Owner will sign the manifest forms as the generator. The Contractor shall make two copies of each manifest before any material is transported from the Site. One copy shall be for the Contractor's records and the other copy shall be given to the Owner. The Contractor shall maintain a log of all manifests and shall provide log to the Owner at the end of the project.

C. Coordinate vehicle inspection and recording of all quantities of material transported off Site. These quantities shall be verified at the disposal facility.

3.03 OFF-SITE DISPOSAL

A. Dispose of waste using an Owner-approved waste management facility.

B. Schedule and coordinate transportation with the disposal facility.

3.04 RECORD KEEPING

A. Provide to the Owner or the Owner's Representative a daily log of all manifests prepared for the Site and a record of the weight measured for each load.

END OF SECTION 01620

SECTION 01700

CONTRACT CLOSE-OUT

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. The procedures for closing out the project are covered in this section.

1.02 PREFINAL INSPECTION

A. A prefinal inspection will be conducted upon project completion. The prefinal inspection will be led by the Owner's Representative. Participants in the prefinal inspection will include the Owner, Owner's Representative, and the Contractor.

B. The prefinal inspection will consist of a walk-through inspection of the entire Site. The Owner and the Owner's Representative will inspect the Site work to determine whether the project is complete and consistent with the Contract Documents.

C. Upon completion of the prefinal inspection, a prefinal inspection report will be prepared by the Owner's Representative. The prefinal inspection report will outline the outstanding construction items, actions required to resolve items, completion date for these items, and a date for final inspection.

1.03 PREFINAL CONSTRUCTION CONFERENCE

A. Upon preliminary project completion, the Contractor will request a prefinal construction conference with the Owner and the Owner's Representative. The objective of this conference will be to discuss the procedures and requirements for project completion and close-out.

B. Items to be covered at the conference include but is not limited to:
   1. Final submittals;
   2. Cleanup responsibilities;
   3. Demobilization activities; and
   4. Prefinal inspection findings.

1.04 FINAL SUBMITTALS

A. The project will not be certified as complete until all of the following have been submitted as required in SECTION 01300 - SUBMITTALS:
   1. Final shop drawings;
   2. Hard copy and electronic copies of 'As-Built' drawings; and
   3. Submittals required elsewhere in the Contract Documents.

1.05 FINAL CLEANING

A. At completion of work and immediately prior to final inspection, the Contractor shall clean the entire Site according to the following provisions:
   1. Leave the Site in a complete and finished condition to the satisfaction of the Owner.
   2. Remove from the Site, temporary structures, materials, equipment, and appurtenances not required as part of, or appurtenant to, the completed work. See Section 01500 - CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS.
   3. Leave water courses and ditches open and in condition satisfactory to the Owner's Representative.

1.06 FINAL INSPECTION AND CERTIFICATION

A. After final cleaning and upon written notice from the Contractor that all final submittals have been submitted and all items noted in the prefinal inspection report have been completed, a final inspection will be conducted by the Owner and the Owner's Representative. Participants in the final inspection will include all parties to the prefinal inspection.

B. The final inspection will consist of a walk-through inspection of the Project Site. The prefinal inspection report will be used as a checklist by the Owner and Owner's Representative, with the inspection focusing on the outstanding items identified in the prefinal inspection. The Contractor's demobilization activities should be completed, except for equipment and materials required to complete outstanding items at time of inspection.

C. The Owner and Owner's Representative will confirm that all outstanding items have been resolved. If any items are still unresolved the inspection shall be considered a prefinal inspection requiring another prefinal inspection report.

D. If on the basis of the Owner and Owner's Representative's observation and review of the completed work during the final inspection, the Owner and Owner's Representative determines that the Contractor has completed all of the work in accordance with the contract documents, the project Certificate of Completion will be prepared by the Owner's Representative for the Owner's and Contractor's signatures.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01700

DIVISION 2

SITE WORK

SECTION 02015

OVERBURDEN GROUNDWATER MONITORING WELLS

PART 1 - GENERAL

1.01 WORK SPECIFIED

A. The Contractor shall provide all labor, materials, equipment, and incidentals as required by this section to complete the Work as described.

B. Groundwater monitoring wells will be installed at the Site in locations shown on the drawings. The wells will be constructed using the appropriate equipment to advance the borehole to its completion depth and install a monitoring well. The drilling equipment and well materials include: 4.25-inch inner diameter (ID) hollow stem augers, 2-inch ID Type 304 stainless steel well screen and riser, 4-inch square protective casing, and concrete surface seal.

1.02 SUBMITTALS

A. Product Data: The product data for each component to be used in construction of the monitoring wells, including well screen, filter pack, cement and bentonite must be submitted to the Contractor. Product data must include manufacturers name and the source of the material and be submitted prior to use in well construction.

B. Installer: The name and address of the proposed well driller and a list of at least five completed projects of similar construction must also be submitted by the Contractor.

1.03 REFERENCE STANDARDS

A. Mississippi Department of Environmental Quality. Construction Standards for Wells and Special Purpose Holes, December 22, 1994.

PART 2 - PRODUCTS

2.01 PROTECTIVE CASING

A. The protective casing shall be a minimum 4-inch square steel with a rod-type locking cap. The lock for the cap shall be all weather-resistant and keyed alike to match existing locks on site.

2.02 WELL RISER

A. The monitoring well riser pipe will be 2-inch ID, flush joint, threaded, Type 304 stainless steel. The riser shall be free of any ink or printing.

2.03 WELL SCREEN

A. The well screen will be 2-inch ID, flush joint, threaded, Type 304 stainless steel with a threaded stainless steel bottom plug. The screen sections will be ten feet in length and will be wire wrapped with 0.01 inch openings (10-slot). The screen shall be free of any ink or printing.

2.04 VENT CAPS

A. A 2-inch diameter stainless steel vent cap shall be provided for the riser.

2.05 SAND PACK

A. The primary sand pack surrounding the well screen will be a clean, inert, siliceous material with a grain size greater than 0.01 inches.

B. The secondary sand pack will be composed of fine sand with 100 percent of the grains passing a No. 30 sieve and less than two percent of the grains passing a No. 200 sieve.

2.06 BENTONITE SEAL

A. The bentonite seal will consist of 3/8-inch diameter sodium bentonite pellets. In unsaturated conditions, the bentonite pellets will be hydrated with potable water. The bentonite pellets will be allowed to hydrate a minimum of 30 minutes after installation.

2.07 GROUT MIXTURE

A. The grout mixture shall be a mixture of Type I Portland Cement (1-94 lb. bag), minus No. 200 sieve bentonite powder (3 lbs.), and potable water (7 gallons) in appropriate quantity to fill the borehole.

2.08 CONCRETE SURFACE SEAL

A. The concrete surface seal must be constructed with dimensions of one-foot thickness and four feet square. The surface seal will contain Type I Portland Cement with processed aggregates containing no deleterious materials. The concrete will be mixed with clean potable water to obtain a mix strength of 3,000 psi at a minimum. The concrete will be placed in a 4 x 4 foot form around the base of the protective casing at ground surface. The cement surface seal will be reinforced with reinforcing bars. The surface seal must also be constructed to prevent ponding of rainwater or irrigation water around the well and surface water from entering the well.

2.09 BUMPER GUARDS

A. The bumper guards shall be 6” diameter steel poles filled with concrete. The concrete mix will contain Type I Portland Cement with processed aggregates containing no deleterious materials. The concrete will be mixed with clean potable water to obtain a mix strength of 3,000 psi at a minimum.

PART 3 - EXECUTION

3.01 MONITORING WELL INSTALLATION

A. Installations shall be supervised by the Field Geologist/Engineer and recorded in a field log book.

B. Monitoring wells shall be installed in the surficial aquifer to specified depths using hollow stem auger drilling techniques. The wells will be screened across the surficial aquifer which exhibits suitable yields and recharge rates. All soil cuttings and drilling fluids will be collected in 55-gallon steel drums. Drilling equipment shall be decontaminated prior to drilling, between boreholes, and before leaving the site, as outlined in this specification.

C. Following completion of drilling, a 2-inch diameter, Type 304 stainless steel well will be constructed through the augers. Each well will be constructed with 2-inch ID, threaded, flush joint, Type 304 stainless steel riser with 10 feet of 0.010-inch wire wrapped, Type 304 stainless steel well screen. The annulus around the outside of the well screen will be backfilled with a properly sized clean, inert, silica sand that extends from six inches below the bottom of the well screen to a minimum of 2 feet above the top of the well screen. A secondary sand pack, composed of fine-grained, clean, inert silica sand will be extended six inches above the top of the primary sand pack. Both the primary and secondary sand packs will be placed using methods that avoid bridging and ensure accurate placement of filter materials. A minimum three-foot thick bentonite pellet seal will be placed above the secondary sandpack, hydrated, if necessary, and allowed to swell a minimum of 30 minutes. After allowing the bentonite seal to swell, cement/bentonite grout will be installed above the bentonite seal to within two feet of ground surface. The grout will be placed by the tremie method ensuring that it is not diluted by formation water and that any water in the annular space is displaced.

D. The well riser, when installed and grouted, should extend above the ground surface a minimum of 2.5 feet. A permanent measuring point shall be marked on the well riser for measurement of water levels. A vented cap shall be used for closing the well riser.

E. An outer protective casing shall be installed into the borehole after the annular grout for the well riser has been cured. The protective casing shall be a four-inch square steel casing with a rod-type locking cap. The protective casing shall extend to a minimum of 3 feet above the ground surface or to a height so that the vent cap is exposed when the protective casing is opened. Pea gravel (⅜ to ½ inch) shall be placed within the annular space of the well riser and the outer protective casing. The protective casing shall be cemented and sealed in place with a concrete surface seal. Two weep holes, minimum ¼-inch diameter, shall be drilled into the protective casing just above the top of the concrete surface seal for drainage.

F. The concrete surface seal shall consist of a concrete pad conforming to the following dimensions: 4 feet wide by 4 feet long by 1 foot thick. The cement surface seal will be reinforced with reinforcing bars. The surface of the concrete pad shall be sloped away from the protective casing and will extend two inches above ground surface at its outside edge.

A drum type batch machine mixer, or other capable means of mixing concrete must be used to create the concrete mix. The concrete will be protected from physical damage or reduced strength due to weather extremes during mixing, placement, and curing. All concrete will be solid, compact and smooth, free of laitance, cracks, and cold joints. A non-slip broom surface will be applied. The formed surface will be cured by use of moisture-retaining cover or membrane-forming curing compound.

G. For above grade monitoring wells, a minimum of three (3) bumper guards consisting of steel pipes 6 inches in diameter and a minimum 5-foot length shall be installed around the concrete surface seal. The bumper guards shall be installed to a minimum depth of 18 inches below the ground surface in a concrete footing and extend a minimum of 4 feet above ground surface. Concrete shall be placed into the steel pipe to provide additional strength.

H. After wells are completed, the protective casing and bumper guards will be primed and painted a color specified by the Owner. A steel identification plate describing the well construction details and well identification number shall be permanently affixed to the protective casing of each well by rivets or screws.

3.02 ACCEPTANCE

A. If at any time during the installation of a monitoring well the Field Geologist/Engineer determines that the well has not been properly installed, the Contractor shall abandon the hole and slurry grout its full depth as directed by the Field Geologist/Engineer and initiate construction of a new well at a location determined by the Field Geologist/Engineer at no cost to the Owner.

B. Upon completion of a well, the Contractor shall demonstrate to the Field Geologist/Engineer t that the full depth of the monitoring well is free from any obstructions and clear of any formation materials and that the well will produce clean sediment-free water, or the well shall be deemed unacceptable and shall be abandoned and re-drilled at no cost to the Owner.

3.03 DRILLING RECORDS

A. The Field Geologist/Engineer will record all drilling activities in a well log. The well log will contain the following information:

1. A record of the soil materials penetrated and the depth to which they were encountered in accordance with ASTM D2488-90.
2. A record showing lengths of each diameter of casing and screen used and the location of sand pack, bentonite seal and concrete seal.
3. Static groundwater level in the new well and the levels at which water was encountered during drilling.

3.04 SURVEYING

A. Horizontal coordinates and elevation of newly installed wells shall be determined by a state licensed land surveyor. Each well shall be surveyed from the permanent measuring point scribed onto the well riser. Vertical measurements (elevations) shall be measured to within +/-0.01 feet and horizontal measurements within 0.1 feet. Measurements shall be tied into the horizontal and vertical control established for the site.

3.05 DECONTAMINATION

A. The Contractor will not use, reuse, or remove any equipment, materials, samples, or other goods at or from the site until it is certified to be uncontaminated. Decontamination will consist of washing and steam cleaning all equipment and materials that may be required as specified above or at the request of the Field Geologist/Engineer. The drilling crew will undertake the decontamination of the given equipment or materials under the Field Geologist/Engineer supervision. The Contractor shall comply with all requests and procedures of the Field Geologist/Engineer regarding decontamination during the course of the work, close of the workday, and upon completion of the project. Anticipated requests and procedures for decontamination are outlined as follows:

B. General Decontamination Procedures and Requirements
   1. All drilling equipment shall be inspected for integrity of hydraulic and oil fluid handling systems and general overall cleanliness. Leaking hoses, tanks, hydraulic lines, etc., shall be replaced or repaired prior to beginning work.
   2. All well casing, screens, and other construction materials must be in new condition. The well casing and screens shall be ink or printing free. Used materials shall not be permitted in well construction.

C. Initial Cleaning
   1. All drilling equipment and associated tools shall be steam cleaned, upon arrival at the Site. Equipment will include at a minimum, but not be limited to:
      a. drilling rods, bits;
      b. augers (clips, pins, and associated hardware);
      c. samplers (i.e. split spoon, hydropunch);
      d. casing materials (both temporary and permanent);
      e. wrenches;
      f. hammers;
      g. other hand tools and tool boxes;
      h. hoses, tanks;
      i. cable clamps and other holding devices in direct contact with drilling rods; and
      j. drill rig and undercarriage, wheel wells, chassis.
   2. During and following cleaning, equipment shall be handled only with clean gloves. A new set of gloves will be utilized between each location.

3. Cleaned materials shall be protected from contamination by such means as the Field Geologist/Engineer deems necessary.

D. Onsite Cleaning

1. Following use, all equipment with the exception of the carrier truck and undercarriage, shall be steam-cleaned between borings.
2. Down hole sampling equipment must be washed in laboratory grade detergent and water, and rinsed in clean, potable municipal water between consecutive samples and/or each boring, as appropriate.

END OF SECTION 02015

SECTION 02100

SITE PREPARATION

PART 1 – GENERAL

1.01 DESCRIPTION

A. The Contractor shall furnish all materials, equipment, and labor necessary to prepare the site including demolition, clearing, grubbing and stripping.

1.02 SECTION INCLUDES

A. The Site preparation shall include the demolition of the existing asphalt cart path, removal of surface debris, trees, and shrubs necessary to perform the Work.

B. Related Work not included in this section:
   1. Section 01060 – Regulatory compliance
   2. Section 02110 – Demolition
   3. Section 02150 – Clearing and Grubbing
   4. Section 02200 – Earthwork

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Except as otherwise indicated in this Section, the Contractor shall comply with the latest adopted edition of the Mississippi Department of Transportation Standard Specifications for Construction of Road and Bridges.

1.04 CONTRACTOR SUBMITTALS

A. Before starting the Work, the Contractor shall submit a Storm Water Pollution Prevention Plan (SWPPP) to the Owner for review and comment. The Contractor shall revise the SWPPP per the Owner's comments. After Owner approval of the revised SWPPP and before starting the Work, the Contractor shall submit the revised Storm Water Pollution Prevention Plan to the appropriate regulatory agency in accordance with the requirements of Section 01060 - REGULATORY COMPLIANCE.

B. Before completion of the Work, the Contractor shall submit an Affidavit of Legal Disposal attesting to the lawful disposal of all materials removed by clearing and grubbing.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 GENERAL

A. Existing Conditions: The site shall be examined and the Contractor notified of any conditions that affect the Work of this Section.

B. Utility Interference: Where existing utilities interfere with the Work of this Section, the Contractor shall be notified of interferences, and notifications to the relevant departments and utilities shall be provided.

C. Demolition items shown on the Drawings shall comply with the requirements of Section 02110 – DEMOLITION.

D. Clearing and Grubbing shall comply with the requirements of Section 02150 – CLEARING AND GRUBBING.

END OF SECTION 02110

SECTION 02110

DEMOLITION

PART 1 - GENERAL

1.01 DESCRIPTION

A. The Contractor shall provide labor, equipment, tools, materials, and services needed to accomplish all site demolition activities described herein and as shown on the Drawings.

1.02 SECTION INCLUDES

A. The Contractor shall perform demolition complete as indicated, specified, and required. All work, during its progress, and upon completion, shall conform to the Drawings and Specifications.

B. Should any detail or details be omitted from the Drawings, then it shall be the responsibility of the Contractor to furnish and execute such detail, so that on completion of the proposed construction, the Site shall be acceptable to Owner.

C. Principal items to be demolished included in this Section, are as follows:

D. Demolition Items at Start of Work:

1. Demolition and removal of existing asphalt cart path and other items as shown on the Drawings.
2. Demolition and removal of all other aboveground man-made structures that are designated for demolition other than the concrete structures.
3. Removal of utilities that may hinder construction activities or create a safety hazard during performance of the Work.
4. Rubble material and debris resulting from demolition activities shall be transported and disposed of in a construction/demolition (C&D) landfill unless otherwise approved by the Owner.

E. Demolition Items at Completion of the Work:

1. Removal of temporary facilities constructed to perform the Work.
2. Dismantling and removal of all utilities for temporary facilities.
3. Removal of temporary access roads.
4. Dismantling and removal of temporary drainage, erosion, and sediment control devices.
5. Debris and waste resulting from the demolition activities shall be transported and disposed of in a C&D landfill unless otherwise approved by the Owner.

F. Related Work not included in this section:

1. Section 02200 – Earthwork

1.03 REFERENCE DOCUMENTS

A. Mississippi Department of Transportation (DOT) Standard Specifications for Construction of Road and Bridges, latest edition.

1.04 VERIFICATION OF CONDITIONS

A. Prior to performance of demolition work, Contractor shall inspect the Site, and perform the following:
   1. Thoroughly investigate on- and off-site conditions as they affect Work.
   2. Determine applicable requirements of governing authorities.

B. Furnish all incidental licenses, permits, approval, and inspections required by governing authorities.

1.05 SUBMITTALS

A. The Contractor shall submit in writing to the Owner as part of the Site Operations Plan (see Section 01300 – SUBMITTALS), a detailed plan describing the resources, procedures, and processes for performing the demolition operation. The Contractor shall prepare its Signage Plan, as part of the Site Operations Plan, in accordance with 'Manual of Uniformed Traffic Control Devices' for barricades, warning signs and flaggers for traffic interruptions during construction near Ploesti Drive and the adjacent walkway.

1.06 PROTECTION

A. The Contractor shall exercise care to prevent the spread of dust and flying particles. The Contractor shall apply water to debris and soil during demolition to keep air-borne dust to a minimum.

B. The Contractor shall conduct the demolition activities in compliance with all federal, state, and local regulations regarding dust and/or air quality.

C. The Contractor shall maintain adequate fire protection, including extinguishers, and operative water hose lines during demolition of inflammable portions of Work.

D. The Contractor shall provide temporary barricades, fences, and safeguards to eliminate hazards to persons and property without interference to use of adjacent property, public rights-of-way, utilities, and structures.

E. The Contractor shall locate, identify, and protect utilities that remain from damage. Any damage by the Contractor to the utilities that are not designated to be demolished or removed shall be repaired or replaced by the Contractor to the satisfaction of the Owner's Representative and at no cost to the Owner.

F. The Contractor shall, with approval of the Owner's Representative, re-route vehicular and pedestrian traffic, as necessary to perform the Work.

1.07 SAFETY RULES AND REGULATIONS

A. The Contractor shall perform demolition in conformance with applicable requirements of Subpart T, "Demolition" of OSHA Construction Industry Safety and Health Standards (29 CFR 1926/1910).

B. Prior to implementing the demolition activities, the Contractor shall be responsible for developing a Construction Health and Safety Plan as specified in Section 01065-SAFETY, HEALTH AND EMERGENCY RESPONSE REQUIREMENTS.

C. The Contractor shall comply with MDOT Standard Specifications 107.10 for barricades, warning signs and flaggers.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Water for Dust Control: The Contractor may use on-site water for dust control. If the on-site water supply is inadequate, Contractor shall furnish the water required for dust control.

B. Calcium Chloride: Calcium Chloride for dust control shall conform to the requirements of American Association of State Highway and Transportation Officials (AASHTO) M 144.

C. Moisture Control Equipment: Equipment used to apply water for dust control shall be of type and quality adequate for the Work, shall not leak, and shall be equipped with a distributor bar or other approved device to assure uniform application.

PART 3 - EXECUTION

3.01 PERFORMANCE

A. General
   1. After the receipt date of the Notice to Proceed, the Contractor shall assume responsibility for structures and items to be demolished and/or removed, until such Work is completed.
   2. Work shall be performed by personnel experienced in this type of Work and in such a manner as to eliminate hazards to persons and property without interference with other Work and use of adjacent areas, public rights-of-way, utilities and structures.
   3. Use of explosives is prohibited.
   4. The Contractor shall backfill and grade areas disturbed by demolition to smooth, uniform surfaces in accordance with Section 02200 - EARTHWORK.

5. The Contractor shall be responsible for necessary precaution and preparedness to minimize fire hazards during demolition. At a minimum, the Contractor shall carry out following requirements:
    a. Before removing any part of any facility, remove volatile or flammable materials such as fuel oil, gasoline, kerosene, cleaning fluids, paints, thinners, cloth, loose paper, combustible trash, and similar materials which might serve as ready fuel for small fires. This material shall be disposed in an approved off-site disposal facility.
    b. Maintain sufficient number of fire extinguishers to check and extinguish small fires in areas where the Work is being performed.
    c. Wherever a cutting torch or other equipment, which might cause a fire, is being used, fire extinguishers shall be kept nearby and ready for instant use. Users of such equipment shall be instructed in proper method of preventing fires and extinguishing fire.
    d. On-site burning of demolition debris or trash will not be allowed.

B. Utilities
1. Locations of existing on-site utilities shown on the Drawings were determined by the best information available.
2. Verify and locate all utilities within the areas to be demolished. Those utilities not shown on the Drawing shall be brought to the attention of the Owner's Representative.
3. Notify utility firms that have company-owned equipment or utility lines on Site or near the Site. Verify the disconnection, removal, or relocation by the utility company before commencing demolition.
4. Utilities not specifically noted for demolition, but which are encountered in the Work shall be capped, extended, protected, or reworked as directed by the Owner or Owner's Representative.

C. Traffic Control
1. The Contractor shall conduct demolition and debris removal operations so as to minimize interference with roads, walkways, and other adjacent occupied properties.
2. The Contractor shall provide alternate routes around closed or obstructed traffic ways.
3. The Contractor shall not close, block, or otherwise obstruct roads or facilities without approval of Owner's Representative.

D. Asphalt Cart Path
1. The amount of asphalt cart path removal shall be the minimum necessary to perform the earthwork operations as specified in Section 02200 – EARTHWORK.
2. The Contractor shall remove the existing asphalt cart path to neatly sawed edges at right angle to the alignment of the cart path.

3. If approved by the Owner, the removed asphalt cart path may be used as fill material below the methane collection layer. If on-site placement is approved by the Owner, the removed asphalt cart path material shall not be placed less than one foot of the geonet (i.e., the gas venting layer) (see Section 02200 – EARTHWORK). If on-site placement is not approved by the Owner, the Contractor shall dispose of the removed asphalt cart path at an off-site disposal facility approved by the Owner.

E. Golf Course Sprinklers

1. The Contractor shall cap and plug the water lines for the existing golf course sprinkler system located at the Site. Portions of water lines that shall be capped and plugged are shown on the Drawings.
2. The Contractor shall reuse the removed sprinkler system components for the new Irrigation System with the approval of Owner's Representative.

3.02 DISPOSAL OF MATERIALS

A. Promptly remove from the Site all debris and waste materials generated during the demolition activities.

B. The Site shall be kept in a clean and orderly state during demolition and debris removal activities.

C. Find suitable off-site facilities for the disposal of debris resulting from the demolition work. The Contractor shall secure the services of the disposal facilities. The disposal facility must be approved by the Owner prior to the transportation of the demolition waste to the disposal facility.

D. Seek and obtain approval from all relevant authorities and shall file with the Owner copies of all approvals or agreements so obtained.

3.03 CLEANING

A. The Contractor shall keep its work, and the adjacent areas affected, free and clear from all debris generated by demolition operations.

B. During and upon completion of work herein specified, the Contractor shall remove from the Site all unsuitable or unused materials and equipment.

C. The Contractor shall leave work areas in a clean condition acceptable to the Owner's Representative.

END OF SECTION 02110

SECTION 02150

CLEARING AND GRUBBING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Site clearing and grubbing shall include removal of surface debris, trees and shrubs, and removal of root systems as shown on the Drawings and disposal of refuse and debris as designated in this Section.

B. Contractor shall provide labor, equipment, tools, materials, and services needed to accomplish all site clearing, grubbing, and debris disposal activities described herein and shown on the Drawings.

C. Related Work not included in this section:
   1. Section 02200 – Earthwork
   2. Section 02270 – Sediment and Erosion Control

1.02 DEFINITIONS

A. Clearing: Clearing shall consist of the felling, trimming, and cutting of trees into sections, and the satisfactory disposal of the trees and other vegetation designated for removal, including brush, grass, vegetative matter and other unsuitable materials within the project limits shown on the Drawings.

B. Grubbing: Grubbing consists of the complete removal of stumps, roots, and other vegetative material below the ground surface at areas requiring grading to perform Work within the limits of clearing.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Water for Dust Control: The Contractor may use on-site water for dust control. If on-site water supply is inadequate, Contractor shall furnish the water required for dust control.

B. Calcium Chloride: Calcium chloride for dust control shall conform to the requirements of AASHTO M 144.

C. Moisture Control Equipment: Equipment used to apply water for dust control shall be of type and quality adequate for the work, shall not leak, and shall be equipped with a distributor bar or other approved device to assure uniform application.

PART 3 - EXECUTION

3.01 PREPARATION

A. The Contractor shall verify that existing plant life designated by the Owner or the Owner's Representative to remain within the area specified for clearing, is tagged or otherwise identified.

B. Removal or disturbance of live oak trees is strictly prohibited. Contractor operations are restricted within a horizontal distance of the live oak tree canopy.

3.02 CLEARING

A. Limits of Clearing: All areas requiring clearing are shown on the Drawings.

B. Clearing Operation:

1. The Contractor shall cut trees, shrubs, bushes, and other vegetation flush with ground surface.
2. The Contractor shall take precautions to prevent damage to the existing structures and utilities that are designated to remain on the Site as shown on the Drawings, tagged or otherwise identified. Where damage occurs, it shall be the responsibility of the Contractor to notify the Owner's Representative and Owner in a timely manner and to restore the damaged structure solely at the Contractor's cost to the satisfaction of the Owner.
3. In cutting timber growth, the Contractor shall make cuts such that all trees fell into the area to be cleared. Vegetative material shall not be allowed into waters of the Back Bay of Biloxi.
4. The Contractor shall clear undergrowth and deadwood without disturbing subsoil.

3.03 GRUBBING

A. Limits of Grubbing: All areas requiring grubbing are as shown on the Drawings.

B. Grubbing Operations: Grub out all stumps and roots including tap roots or lateral roots 1-1/2 inches or more in diameter, and the removal of brush, grass or weeds to depths below the natural ground. Stumps and roots shall be grubbed to a depth of one (1) foot or to a depth required by the construction activity to be conducted in the area to execute the Work.

3.04 SEDIMENT AND EROSION CONTROL

A. The Contractor shall implement temporary erosion control measures in accordance with Section 02270 – SEDIMENT AND EROSION CONTROL along the downgradient edge of the area affected by clearing work described in this Section.

3.05 DISPOSAL OF MATERIALS

A. The Contractor shall dispose all vegetative debris and other refuse at a Solid Waste Landfill. The Contractor shall secure the services of the disposal facilities. The disposal facility must be approved by the Owner prior to the transportation of the vegetative debris and other refuse to the disposal facility.

B. The Contractor shall be responsible for the lawful and safe disposal of all vegetative debris and other refuse.

END OF SECTION 02150

SECTION 02200

EARTHWORK

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide labor, equipment, tools, materials, and services needed to accomplish all site preparation, earthwork, and incidental appurtenant work as described herein or shown on the Drawings.

1.02 SECTION INCLUDES

A. Earthwork shall include all site preparation activities to the lines and grades shown on the Drawings including the following activities: general site grading, excavation, handling and hauling fill materials, preparation of subgrade, trenching, backfill, compaction, and control of water.

B. Related Sections:
   1. Section 01065 – Safety, Health, And Emergency Response Requirements
   2. Section 01300 – Submittals
   3. Section 02150 – Clearing And Grubbing
   4. Section 02221 – Trench Excavation And Backfill
   5. Section 02260 – Landfill Cover Construction
   6. Section 02280 – Geosynthetics
   7. Section 02422 – Geonet

1.03 REFERENCE DOCUMENTS

A. Mississippi Department of Transportation (MDOT) Standard Specifications for Construction of Road and Bridges, latest edition.

B. American Association of State Highway and Transportation Officials (AASHTO), most current version.

C. Annual Book of ASTM Standards, most current version.

1.04 DEFINITIONS

A. Optimum Moisture Content: "Optimum moisture content" shall be determined by test method ASTM D698 to determine the maximum dry density for relative compaction. Field moisture content shall be determined on the basis of the fraction passing the 3/4-inch sieve.

B. Prepared Ground Surface: The "prepared ground surface" is defined as ground surface after clearing, grubbing, stripping, excavation, and scarification and/or compaction.

C. Completed Course: "Completed Course" is defined as a course or layer that is ready for the next layer or next phase of the Work.

D. Well-Graded: "Well-graded" as used in this section defines a mixture of particle sizes that has no specific concentration or lack thereof of one or more sizes. Well-graded does not define any numerical value that must be placed on the coefficient of uniformity, coefficient of curvature, or other specific grain size distribution parameters. Well-graded is used to define a material type that, when compacted, produces a strong and relatively incompressible soil mass free from detrimental voids.

E. Unsuitable Material: Material from demolition work and excavations that is not suitable for backfilling or for use in compacted fills.

F. General Backfill: Material from on-site sources including the existing dirt and rubble piles, excavations, and trenching that meets the requirements of Subpart 2.01 – Materials.

G. Select Fine Backfill: Fine-grained soils derived from off-site sources that meet the requirements of Subpart 2.01 – Materials.

H. Rock Drain Backfill: Gravelly soils derived from off-site sources that meet the requirements of Subpart 2.01 – Materials.

I. Gravel or Crushed Stone: Crushed rock from off-site sources that meets the requirements of Subpart 2.01 – Materials.

J. Filter Bedding Stone: Gravelly soils derived from off-site sources that meet the requirements of Subpart 2.01 – Materials.

K. Support Facilities: These facilities include the operations area, equipment storage and utilities, roads, and all other areas utilized by the Contractor to support the construction activities.

1.05 SITE INVESTIGATION

A. The boring summaries and related information that are available at the Site data reference documents depict subsurface conditions only at the specific locations and at the particular time designated on the logs. The Site data reference documents are listed in Section 01010 – SUMMARY OF WORK and are available from the Owner upon a written request from the Contractor. Soil and waste material conditions at other locations may differ from conditions occurring at the boring locations. Also the passage of time may result in a change in the subsurface conditions at boring locations.

B. Contractor's Responsibility: The Contractor shall carefully examine the Site and make all inspections necessary in order to determine the full extent of the Work required to make the completed work conform to the Drawings and Specifications. The Contractor shall satisfy himself as to the nature and location of the Work, conditions, the conformation and condition of the existing ground surface, and the character of equipment and facilities needed prior to and during prosecution of the Work. The Contractor shall satisfy himself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered. Any inaccuracies or discrepancies between actual field conditions and Drawings, or between Drawings and Specifications must be brought to the Owner's attention in order to clarify the exact nature of the Work to be performed.

C. The Contractor shall be responsible for the means and methods of doing work under this section.

1.06 SUBMITTALS

A. The submittal of a Site Operations Plan shall be made in accordance with Section 01300 – SUBMITTALS and the requirements of this Section. Material samples and test data for imported materials shall be submitted in accordance with Section 1300 – SUBMITTALS.

1.07 CODES, ORDINANCES, AND STATUTES

A. The Contractor shall familiarize himself/herself with, and comply with, all applicable codes, ordinances and statutes, and bear sole responsibility for all costs incurred and any penalties imposed for noncompliance.

1.08 SAFETY

A. The Contractor shall, in accordance with Specification Section 01065 – Safety, Health and Emergency Response Requirements and 29 CFR Subpart P 1926, develop and implement a Construction Health and Safety Plan (CHSP) approved by the Owner prior to commencing work. The approval of the CHSP by the Owner shall not relieve the Contractor of responsibility to comply with all applicable regulations and requirements for health, safety, and emergency response during execution of the Work.

1.09 ENVIRONMENTAL SAFEGUARDS AND REGULATIONS

A. The Contractor shall comply at all times during the execution of the Work with Federal, State, and local regulations in force to prevent pollution of environmental media.

1.10 QUALITY ASSURANCE

A. By Contractor:

1. The Contractor shall exercise due care to assure procurement, storage, and placement of materials from on-site or off-site sources which will comply with requirements, specifications, and standards set out herein.

2. The Contractor shall engage services of an Independent Testing Laboratory (ITL) to inspect and test fill material, fill placement and compaction. Costs for all such inspections and tests will be paid by the Contractor. The Contractor shall bear the cost of retesting and reinspecting all work that fails to conform to requirements set forth herein and on the Drawings.
3. Testing results prepared by the ITL shall be furnished to the Owner's Representative for review and to determine the conformance and completeness of the work. Test results shall be reviewed by the Owner's Representative no later than one day after the test results are obtained from the ITL.

B. By Owner and Owner's Representative:
1. The Owner and Owner's Representative will review all testing results for accuracy, completeness and conformance with requirements established in the Specifications and Drawings.

C. Applicable Criteria, Tests and Standards:
1. Site Earthwork: Rough graded surface ready to receive rock surfacing shall be graded to ±0.2 feet of the Plan elevation, except where meeting curbs, walks, or building entrances, grade to ±0.1 feet of the Plan. However, acceptance of such irregularities shall not be construed to reduce thickness of rock or pavement. Permanent surface water courses shall be constructed to average plan grades and shall drain completely throughout their length. Finish surfaces shall be ±0.1 feet of the Plan elevation, and all areas shall be finished so as to drain readily.
2. Waste: Material deemed unsuitable from tests by the ITL, or from visual inspection by the Owner's representative shall be properly disposed offsite by the Contractor in a manner that is acceptable to relevant authorities and the Owner.
3. Clean-up: The Contractor shall remove all unsuitable materials from the Site and dispose in accordance with all applicable laws, regulations, permits, and approvals.
4. The Contractor shall use the most current versions of these standards for soil classification, characterization, and testing:
    a. Select Fine Backfill:
        1) Particle Size - ASTM D422
        2) Classification - ASTM D2487
        3) Atterberg Limits - ASTM D4318
        4) Compaction by Standard Proctor - ASTM D698
        5) Moisture Content - ASTM D2216
        6) Density of Soil and Soil Aggregate In-Place by Nuclear Methods - ASTM D2922
    b. Gravel or Crushed Stone Backfill:
        1) Particle Size - ASTM D422
        2) Classification - ASTM D2487
        3) Compaction by Standard Proctor - ASTM D698
        4) Moisture Content - ASTM D2216
        5) Density of Soil and Soil Aggregate In-Place by Nuclear Methods - ASTM D2922

1.11 COMPACTION

A. The maximum dry density and optimum moisture content of each soil type used in controlled compacted fill shall be determined in accordance with ASTM D698.

B. Field density tests shall be determined in accordance with ASTM D698 or ASTM D2922.

1.12 INSPECTION

A. The ITL shall perform the quality assurance/quality control (QA/QC) testing in accordance with the requirements set forth in the approved Construction QA/QC Plan (Work by Others).

B. The ITL shall make field compaction tests for the compacted materials below the surface where the surface is disturbed. When these tests indicate that the compaction of any layer of fill or portion thereof is below the specified compaction, the Contractor shall rework the particular layer or portion until the specified compaction has been obtained.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Select Fine Backfill
   1. The backfill material shall be predominantly hard, durable, inorganic soil free of roots, wood, peat, cinder, masonry debris, and free of deleterious matter or other rubbish.
   2. The fill material for subgrade fill and barrier protection layer shall be Type A-2-4 soil as described by AASHTO Soil Classification System.
   3. The fill material for geonet protection layer shall meet the requirements of Type A-3 soil as described by AASHTO Soil Classification System.
   4. Representative samples of material to be used for fill or backfill shall be tested by the ITL in order to determine the maximum density, Atterberg limits, optimum moisture content and classification of the soil.

B. Gravel or Crushed Stone Backfill: The gravel or crushed stone backfill material shall be a gradation of rock which meets the requirements for Size No. 57 listed in MDOT Section 704.02 and 703.03.2.4. The material shall be predominately hard, durable, inorganic soil free of roots, wood, peat, cinders, masonry debris, and free of deleterious matter or other rubbish.

C. Graded Aggregate Base:
   1. Graded Aggregate Base (GAB) shall be of uniform quality throughout. GAB shall consist of gravel, air-cooled blast furnace slag or crushed stone having hard, strong, durable pieces free of adherent coatings.

2. Detrimental Substances

   The amount of detrimental substances shall not exceed the limits listed below. Detrimental substances would include constituents as shale, weathered or decomposed rock, or any other substance which might be considered detrimental for the use intended.

   a). Flat or elongated particles (particles greater than five times average thickness) – 10 percent.

   b). Glassy particles (slag) – 30 percent

   c). Fractured faces (gravel) – Crushed gravel shall consist of silicious particles of which a minimum of 85 percent, by count, of the material retained on the #4 sieve shall have one or more fractured faces, fractured for the approximate average diameter or thickness of the particle.

   d). Mica Schist – 10 percent. Mica Schist is qualitatively considered to be those materials defined in ASTM: C 294 as phyllite or schist.

   e). Other local detrimental substances – 2 percent.

   f). Aggregates containing Chrysotile (Fibrous Serpentinite): shall not be used.

3. Soundness

   Loss in weight of aggregate bases when subjected to five alternations of the magnesium sulfate soundness test (AASHTO T 104) shall not be more than 15 percent.

4. Grading:

   Grading requirements shall be as follows:

SIZE	PERCENT PASSING BY WEIGHT
2” Sieve	100
1 ½” Sieve	97-100
¾” Sieve	60-95
No. 10 Sieve	25-50
No. 60 Sieve	10-35
No. 200 Sieve	7-15

D. Rip Rap

1. All stone for rip rap shall be sound, durable pieces meeting AASHTO T96 “B” Grading Class A or B quality requirements for coarse aggregate and shall be resistant to the action of air and water, and in all other respects suitable for use as rip rap. Materials not meeting these requirements shall not be used unless approved by petrographic analysis. Flat, slabby, and shaley pieces are not acceptable.

2. Stone for rip rap shall be processed in such a manner as to produce a quarry-run material including fines which meet the following gradation: the largest pieces of material shall have a maximum approximate value of two cubic feet. At least 35% of

the mass shall be comprised of pieces which weigh 125 pounds or more. The remainder shall be well-graded down to the finest size. Rock fines shall comprise a maximum of 10% of the total mass. Rock fines are defined as material passing a No. 4 sieve.

3. Sound concrete may be substituted for stone, if it is broken into the sizes specified herein.

E. Geosynthetic Clay Liner: The geosynthetic shall be an unreinforced geosynthetic clay liner and will serve as a low permeability layer, as specified in Section 02281 – GEOSYNTHETIC CLAY LINER.

F. Geotextile Separation Fabric: This geotextile shall be as specified in Section 02280 – GEOSYNTHETICS.

G. Geonet: The geonet shall be as specified in Section 02422 – GEONET.

H. Water for Compaction: The Contractor may use the on-site water source for modifying soil moisture during compaction. If on-site water supply is inadequate, Contractor shall furnish water required for Work from off-site sources.

I. Compaction Equipment:

1. Compaction equipment shall be of suitable type and adequate to obtain the compaction specified.
2. Compaction equipment shall be operated in strict accordance with the manufacturer's instructions and recommendations. Equipment shall be maintained in such condition that it shall deliver the manufacturer's rated compactive effort. If specified compaction is not obtained, larger and/or different types of additional equipment shall be provided by the Contractor to obtain the specified compaction.

J. Moisture Control Equipment: Equipment used to apply water shall be of type and quality adequate for the work, shall not leak, and shall be equipped with a distributor bar or other approved device to assure uniform application.

K. Mixing Equipment: Equipment for mixing and drying out material shall consist of blades, discs, or other equipment approved by the Owner.

L. Calcium chloride: Calcium chloride for dust control shall conform to the requirements of AASHTO M 144.

PART 3 - EXECUTION

3.01 GENERAL

A. The Contractor shall perform the site work under this specification to construct to the lines, grades, elevations, slopes, and cross sections indicated on the Drawings, and specified herein. Slopes, graded surfaces, and drainage features shall present a neat uniform appearance upon completion of the Work.

B. It shall be the Contractor's responsibility (1) to maintain safety measures and safe working conditions in accordance with the Construction Health and Safety Plan (see Section 01065); and (2) until final acceptance by the Owner, to take all measures necessary during the performance of the Work to protect the entire work area and adjacent properties that would be affected by storm damage, flood hazard, caving of trenches and embankments, and sloughing of material, due to the execution of the Work specified herein.

C. Utility lines and structures which are to remain in service shall be protected by the Contractor from any damage as a result of his operations. Where utility lines or structures not shown on the Drawings are encountered, the Contractor shall report them to the Owner's Representative before proceeding with the work. The Contractor shall bear the cost of repair or replacement of any utility lines or structures which are broken or damaged by its operations.

3.02 EXCAVATION

A. The Contractor shall excavate the Site to elevations required for the construction of all process and support facilities, site access and entrance roads, anchor system, and storm water management controls as shown on the Drawings.

B. The Contractor shall remove or compact all loose soil materials prior to receiving backfill. Any soil material that does not meet the compaction requirements shall be removed prior to receiving backfill.

C. The Contractor shall ensure that the final surface is free of loose material, clods, and other debris including grade stakes and hubs.

D. The Contractor shall keep the construction site free draining at all times during execution of this Work.

E. Excavation methods employed by the Contractor shall be consistent with the soil and rock types encountered.

3.03 SITE GRADING AND SUBGRADE PREPARATION

A. Site Grading

1. The Contractor shall grade the Site to the lines and grades shown on the Drawings. In areas where there are no lines or grades shown on the Drawings, the Contractor shall grade the site to prevent storm water from ponding.
2. Final Grading
    a. Upon completion of construction operations, the Contractor shall grade the area to finish contour elevations and grades shown on the Drawings.
    b. Graded areas shall be made to blend with remaining ground surfaces.
    c. Tolerances of finished surfaces shall be +/- 0.1 feet of the plan elevation. No ponding of water shall be allowed during the Work and at completion of construction.

B. Subgrade Preparation

1. Prepare the existing ground surface or excavation surface for placement of subgrade fill as specified herein by compacting the upper 6 inches of surface soil to a density of at least 90 percent of the maximum dry density, exclusive of roadway subgrade.
2. Prepare the cart path subgrade as specified herein by compacting the upper 6 inches of surface soil to a density of at least 95 percent of the maximum dry density.
3. Remove soft soil or compressible materials in work areas identified by failure to achieve the specified density. Unstable materials shall be excavated to 18 inches minimum depth below the subgrade base or to a depth determined necessary by the Owner's Representative. If over-excavated material is waste as determined by the Owner or the Owner's Representative, Contractor shall dispose of waste material in accordance with disposal of other unsuitable materials. The Contractor shall compact the backfill to 90 percent of the maximum dry density, exclusive of backfill for the cart path which will require compaction to 95 percent of maximum dry density.

3.04 SLOPING

A. The Contractor shall construct and maintain sloping as required by OSHA and other applicable regulations and requirements.

3.05 BACKFILLING

A. General

1. All vegetative matter and unsuitable material shall be removed by the Contractor from surface upon which the fill is to be placed. The Contractor shall remove any loose and porous soil or shall compact to a depth specified by the Owner's Representative. The surface shall then be plowed or scarified to a minimum depth of 6 inches until surface is free from uneven features that would tend to prevent uniform compaction by equipment to be used.
2. After the foundation for the fill has been cleared, plowed or scarified, it shall be disked or bladed by the Contractor until it is uniform and free from large clods, brought to the proper moisture content and compacted.

B. Subgrade Fill, Geonet Protection Layer, Barrier Protection Layer, and Gravel or Crushed Stone

1. The backfill material shall be select fine backfill placed in 9 inch loose lifts that when compacted shall not exceed 6 inches. Each layer shall be spread evenly and shall be thoroughly mixed during the spreading to obtain uniformity of material in each layer.
2. The moisture conditioning requirements of select fine backfill material shall be determined by the ITL prior to construction as specified herein in Subpart 2.01.B.
3. The select fine backfill shall be moistened or aerated to control the moisture content. The moisture content shall be within +2 percent of the optimum moisture content based on Standard Proctor Compaction Test performed in accordance with ASTM D698.

4. The moisture content of the select fine backfill material shall be uniform and homogeneous. If dry zones are encountered within the backfill material, the Contractor shall moisture condition and mix with the surrounding material. If fill material becomes soft or too wet, fill shall be aerated by blading, mixing, or other satisfactory methods until moisture content is as specified.
5. The Contractor shall scarify the surface of the select fine backfill material lift to a depth of 2 inches prior to placing subsequent lift.
6. The Contractor shall place fill materials in continuous approximately horizontal layers.
7. All fill placement shall be witnessed by the Owner's Representative.

3.06 COMPACTION

A. General: The Contractor shall compact in place the backfill material by heavy compaction equipment such as dozers or self propelled compactors. The number of passes shall be determined in the field by the Owner's Representative.

B. Subgrade Fill, Geonet Protection Layer, Barrier Protection Layer, and Gravel or Crushed Stone
   1. The Contractor shall compact the select fine backfill materials to 90 percent of the maximum dry density as determined by the Standard Proctor Compaction Test performed in accordance with ASTM D698, unless otherwise stated.
   2. The Contractor shall conduct quality assurance testing as specified in Subpart 1.10 – Quality Assurance and the Construction QA/QC Plan.
   3. If tests indicate that density of compacted fill is less than that specified, the Contractor shall either recompact or undercut, fill, and compact area until specified density is achieved.
   4. Fill density and moisture tests shall be performed by the ITL to verify that the specified degree of compaction is being achieved.
      a. At least one density test shall be performed for the select fine backfill every 5,000 square feet of fill area.
      b. At least one density test shall be performed for the gravel or crushed stone every 1,500 square feet of fill area.
   5. The Contractor shall smooth out the compacted final lift surface with a smooth steel wheel roller or rubber-tired roller.
   6. Proofrolling: All areas where structures are to be built on compacted fill and other areas where indicated on the Drawing, shall be proofrolled to detect soft spots prior to the placement of fill material or construction of foundations.

3.07 STOCKPILES

A. The Contractor shall stockpile excavated material resulting from the activities described in this Section at a location onsite designated by the Owner's Representative.

B. The Contractor shall implement erosion control measures for the stockpiles in accordance with Section 02270 - SEDIMENT AND EROSION CONTROL.

C. The Contractor shall grade the stockpiles and surrounding areas to provide positive drainage away from the stockpiles at all times.

3.08 DUST CONTROL

A. The Contractor shall furnish and place water and calcium chloride conforming to specifications listed in Subpart 2.01 – Materials, herein on roadways and working areas for dust control, when directed by the Owner or Owner's Representative.

3.09 CONTROL OF DRAINAGE WATER DURING CONSTRUCTION

A. The Contractor shall control drainage water from the construction operations so that no damage will be done to the Site Work. The Contractor shall be responsible for any damages to persons or property on or off the construction site due to such drainage water or to the interruption or diversion of such storm water on account on his operations.

B. The Contractor shall conform to requirements of Section 02700 - SITE DRAINAGE.

3.10 GEOSYNTHETIC CLAY LINER

A. The Contractor shall install the geosynthetic clay liner as shown in the Drawings and as specified in Section 02281 – GEOSYNTHETIC CLAY LINER.

3.11 GEOTEXTLE FILTER LAYER

A. The Contractor shall install the geotextile filter layer as shown in the Drawings and as specified in Section 02280 – GEOSYNTHETICS.

3.12 GAS VENTING LAYER:

A. Install the gas venting layer as shown in the Drawings and as specified in Section 02422 – GEONET.

3.13 SUPPORT FACILITIES CONSTRUCTION

A. Clearing and Grubbing: The Contractor shall complete clearing and grubbing in areas proposed for these facilities as specified in Section 02150 – CLEARING AND GRUBBING prior to beginning work specified in this Section.

B. The Contractor shall construct areas of the support facilities that involve excavation in accordance with Subpart 3.02 - Excavation.

C. Subgrade Preparation: The Contractor shall grade the area and prepare the subgrade as specified in Subpart 3.03 - Site Grading and Subgrade Preparation.

D. The Contractor shall backfill and compact areas of the support facilities in accordance with Subpart 3.05 - Backfilling and Subpart 3.06 - Compaction.

E. The Contractor shall install any drainage control devices or materials as shown on the drawings or as necessary to facilitate the movement of water away from site operation activities. Drainage control devices and materials shall be as specified in Section 02700 - SITE DRAINAGE.

F. The Contractor shall install any erosion control devices or materials as shown on the Drawings or as necessary to prevent the sedimentation of waterways and the erosion of the Site. Erosion control devices and materials are specified in Section 02270 - SEDIMENT AND EROSION CONTROL.

G. The Contractor shall construct temporary all-weather access roads for performance of the Work and access to the Site activities.

3.14 CLEAN-UP

A. Upon completion of work in this section, the Contractor shall remove all rubbish and debris from the Site. The Contractor shall be solely responsible for collection, storage, and disposal of all rubbish and debris resulting from the earthwork activities in compliance with all applicable local, state, and federal regulations and requirements. The entire area involved shall be left in a neat, clean, and acceptable condition.

END OF SECTION 02200

SECTION 02221

TRENCH EXCAVATION AND BACKFILL

PART 1 - GENERAL

1.01 DESCRIPTION

A. The Contractor shall provide labor, equipment, tools, materials, and services needed to complete all trench excavation, backfill, compaction, and incidental appurtenant work as described herein or shown on the Drawings.

1.02 SECTION INCLUDES

A. This section covers the work necessary for trench excavations, backfill, and compaction.

B. Related Sections
   1. Section 02200 – Earthwork
   2. Section 02280 – Geosynthetics
   3. Section 02720 – Storm Drains
   4. Section 03310 – Forms, Concrete, and Reinforcement

1.03 REFERENCE DOCUMENTS

A. Mississippi Department of Transportation (MDOT) Standard Specifications for Construction of Road and Bridges, latest edition.

B. American Association of State Highway and Transportation Officials (AASHTO), most current version.

C. Annual Book of ASTM Standards, most current version.

D. Manual of Uniformed Traffic Control Devices (MUTCD), most current version.

1.04 DEFINITIONS

A. Optimum Moisture Content: "Optimum moisture content" shall be determined by the test method ASTM D698 to determine the maximum dry density for relative compaction. Field moisture content shall be determined on the basis of the fraction passing the 3/4-inch sieve.

B. Unsuitable Material: Material from demolition work, excavation, and trenching that is not suitable for backfilling, trench excavations, or for use in compacted fills.

C. Granular Bedding Material: Crushed rock from off-site sources that meets requirements of Paragraph 2.01 -Materials.

D. Backfill Soils: Soil from on-site sources that meets the requirements of Subpart 2.01 - Materials.

E. Pipe Zone Material: Sand or sandy soil material from off-site sources that meets requirements of Subpart 2.01 -Materials.

1.05 SITE INVESTIGATION

A. The boring summaries and related information that are available in the Site data reference documents depict subsurface conditions only at specific locations and at that particular time designated on the logs. The Site data reference documents are listed in Section 01010 - SUMMARY OF WORK and are available from the Owner upon a written request from the Contractor. Soil and waste material conditions at other locations may differ from conditions occurring at the boring locations. Also the passage of time may result in a change in the subsurface conditions at boring locations.

B. Contractor's Responsibility: The Contractor shall carefully examine the Site and make all inspections necessary in order to determine the full extent of the Work required conforms to the Drawings and Specifications. The Contractor shall satisfy himself as to nature and location of the Work, conditions, the conformation and condition of existing ground surface, and character of equipment and facilities needed prior to and during prosecution of the Work. The Contractor shall satisfy himself as to character, quality, and quantity of surface and subsurface materials or obstacles to be encountered. Any inaccuracies or discrepancies between actual field conditions and the Drawings, or between the Drawings and Specifications must be brought to the Owner's Representative's attention in order to clarify the exact nature of the Work to be performed.

C. The Contractor shall be responsible for the means and methods of doing work under this section.

1.06 SUBMITTALS

A. The submittal of a Site Operations Plan shall be made in accordance with Section 01300 - SUBMITTALS. Material samples and test data for imported materials shall be submitted in accordance with Section 1300 – SUBMITTALS.

1.07 CODES, ORDINANCES, AND STATUTES

A. The Contractor shall familiarize himself with, and comply with, all applicable codes, ordinances and statutes, and bear sole responsibility for all costs incurred and any penalties imposed for noncompliance.

1.08 SAFETY

A. The Contractor shall, in accordance with Section 01065-SAFETY, HEALTH, AND EMERGENCY RESPONSE REQUIREMENTS, develop and implement a Construction Health and Safety Plan (CHSP) approved by the Owner prior to commencing work. The approval of the CHSP by the Owner shall not relieve the Contractor of responsibility to comply with all applicable regulations and requirements for health, safety, and emergency response during the execution of the Work.

1.09 ENVIRONMENTAL SAFEGUARDS AND REGULATIONS

A. The Contractor shall comply at all times during the execution of the Work with Federal, State, and local regulations in force to prevent pollution of environmental media.

1.10 QUALITY ASSURANCE

A. The Contractor shall provide quality assurance as specified in Section 02200 - EARTHWORK.

1.11 INSPECTION

A. The Contractor shall engage services of an Independent Testing Laboratory (ITL) to perform the quality assurance/quality control testing in accordance with the requirements set forth in the Owner-approved Construction QA/QC Plan. Costs for all such inspections and tests will be paid by the Contractor. The Contractor shall bear the cost of retesting and reinspecting all work that fails to conform to requirements set forth herein and on the Drawings.

B. The ITL shall make field compaction tests in the compacted materials below the surface where the surface is disturbed. When these tests indicate that compaction of any layer of fill or portion thereof is less than specified compaction, the Contractor shall rework the particular layer or portion until specified compaction has been obtained.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Backfill Soils: Excavated on-site soils, except when unsuitable soils are encountered, as determined by the Owner's Representative. If on-site soils are not suitable, select fine backfill, as specified in Section 02200 -EARTHWORK, may be used for backfill.

B. Pipe Zone Material: This shall be a sand or sandy soil all of which passes the 3/8 inch sieve and not more than 10 percent passing the No. 200 sieve. The material shall be predominantly hard, durable, inorganic soil free of roots, wood, peat, cinders, masonry debris, and free of deleterious matter or other rubbish.

C. Granular Bedding Material: The bedding material shall be a gradation of rock which meets the requirements for Size No. 57 listed in Section 704.02 and 703.03.2.4 of 1996 MDOT Standard Specifications. The material shall be predominantly hard, durable, inorganic soil free of roots, wood, peat, cinders, masonry debris, and free of deleterious matter or other rubbish.

D. Geotextile Stabilization Layer: The geotextile shall be as specified in Section 02280 - GEOSYNTHETICS.

PART 3 – EXECUTION

3.01 GENERAL TRENCH EXCAVATION

A. Trench excavation shall include the excavation and removal of all material for installation of the pipe or facility and shall include as necessary the construction of trench shoring and stabilization measures, timbering and all necessary installations for dewatering.

B. Minimum Width of Trench: The minimum width of pipe trenches, measured at the crown of the pipe, shall not be less than 12 inches greater than the exterior diameter of pipe, exclusive of bells. The minimum width shall be exclusive of all trench supports.

C. Maximum Width of Trench

1. The maximum allowable width of trench for all pipelines measured at the top of pipe shall be outside diameter of the pipe (exclusive of bells and collars) plus 24 inches and such maximum shall be exclusive of all trench supports.
2. A trench wider than the outside diameter of the pipe plus 24 inches may be used if the Contractor, at his expense will furnish pipe of required strength to carry additional trench load. The Contractor shall obtain Owner's approval in writing prior to performing such modifications.

D. Trench Side Slopes

1. Temporary trench excavations shall at all times conform to the safety requirements of Subpart 1.08 -Safety.
2. Loose material, including cobbles or boulders, shall be removed from the sides of the trenches before allowing workers into the excavation, or the trench slopes must be protected with other methods approved by the Owner's Representative. Trench side slopes shall be kept moist during construction to prevent sloughing and raveling. Surcharge loads due to construction equipment shall not be permitted within 5 feet of the top of any excavated slope.
3. If the Contractor elects to shore or otherwise stabilize the trench sides, he shall file with the Owner for review, copies of drawings for same prepared and signed by a professional engineer registered in the State of Mississippi before commencing excavation.

E. Excess Trench Excavation: If any trench, through the neglect of the Contractor, is excavated below the bottom grade required, it shall be refilled to the bottom grade, at the Contractor's expense for all labor and material, with specified granular bedding material compacted to a firm stable foundation.

F. Any removal or disturbance of live oak trees at or near the areas of construction is strictly prohibited. Disturbance shall include impacting the root structure.

G. The Contractor shall be responsible for ascertaining from his own inspection of the Site and the respective utility authorities all mains, pipes, and cables whether underground or overhead. The Contractor shall prepare and protect the existing utilities for continued service during and after the performance of the Work.

H. Where excavation is carried out close to sewers, pipes, cables, or other services, the Contractor shall provide temporary supports or slings.
   1. Where such sewer, pipe, cable, or other service is required to be temporarily disconnected, the Contractor shall receive written approval from Owner prior to beginning the Work.
   2. Where such sewer, pipe, cable, or other service is accidentally disturbed, it shall be repaired or replaced to the satisfaction of the Owner's Representative at no cost to the Owner.

3.02 TRENCH EXCAVATION IN ROADS

A. Where open excavation is allowed, all trench excavation and other work carried out within the limits of any existing road shall be carried out as rapidly as possible.

B. Traffic Control
   1. The Contractor shall comply with MDOT Section 107.10 for barricades, warning signs and flaggers.
   2. If the complete obstruction of the roadway is necessary to perform the construction activities for any significant period of time, the Contractor shall obtain written permission from the Owner.
   3. The Contractor shall provide a vehicular and pedestrian traffic re-routing plan as part of the Operations Plan as specified in Section 01300 - SUBMITTALS.
   4. The vehicular and pedestrian traffic re-routing plan shall include a signage plan in accordance with the Part II of the "Manual of Uniformed Traffic Control Devices."

C. Road drains and channels shall be kept free from obstructions at all times.

D. Where trench excavation or any part of the works obstructs any walkway, the Contractor shall provide a temporary walkway around the obstruction to the satisfaction of the Owner.

E. Where excavated material has temporarily been deposited on a grass margin or verge, the margin shall on completion of refill be restored entirely to its original condition and left free from loose stones.

3.03 BRACING TRENCHES

A. The sides of the trenches shall be supported with plank sheeting and bracing in such a manner as to prevent caving of the sides of the trench.

B. Space left by the withdrawal of sheeting or shoring shall be filled completely with dry granular material blown or rammed in place.

C. All trenches deeper than 5 feet shall be shored unless cut to the angle of repose of the excavated soils. In addition, the Contractor shall be required to comply with all OSHA requirements found in CPR 1926, Subpart P.

3.04 CONTROL OF WATER

A. General: The Contractor shall furnish, install and operate all necessary machinery, appliances, and equipment to keep excavations free from water during construction and shall remove water so as not to cause damage to adjacent structures or properties.

B. Drainage Provisions: Drainage ditches, diversions, and temporary pipes shall be constructed as required to maintain drainage of the works area.

C. Dewatering
   1. The Contractor shall perform dewatering as required so that all work is installed on dry areas and excavations.
   2. The Contractor shall ensure that dewatering is carried out only to a depth sufficient for required excavation.
   3. The Contractor may pump the collected water into the Back. Bay if the water meets the State of Mississippi water quality criteria standards for storm water discharge.

3.05 PIPE BEDDING

A. The Contractor shall excavate to 6 inches minimum below the bells or couplings for full width of trench and shall place a minimum 6 inches of granular bedding material upon which the pipe is to be laid.

B. Where groundwater is encountered, and native material does not afford a solid foundation for pipe subgrade, the Contractor shall suitably dewater the trench and shall construct a film, stable base for pipe by excavating any unstable material to 18 inches minimum depth below subgrade base or to a depth determined necessary by the Owner's Representative. The Contractor shall then construct a stable base below the subgrade base by placing geotextile stabilization layer and stabilizer aggregate the trench bottom as shown.

C. Prior to lowering the pipe in place, the granular bedding material shall be prepared so that the pipe will have a firm and uniform bearing over the entire length of the barrel and a minimum width equal to 0.7 times outside diameter of pipe. All adjustments in line and grade shall be made by scraping away or filling and tamping in under barrel of pipe. Wedging and blocking are not permitted.

D. The installation of concrete pipe, fittings, manholes, inlets, and appurtenances shall be installed as specified in Section 02720 - STORM DRAINS.

3.06 BACKFILLING PIPE TRENCHES

A. Backfilling Pipe Zone
   1. The Contractor shall not damage the pipe or coatings on the pipe.
   2. The Contractor shall place the pipe zone material simultaneously on each side of the pipe for the full width of the trench and the depth of pipe zone in layers 6 inch in depth. Each layer shall be thoroughly compacted by hand tamping. Particular attention shall be given to the underside of the pipe and fittings to provide a firm support along the full length of pipe.
   3. The pipe zone is considered to extend 12 inches above the top of the pipe, and shall be compacted to 90 percent of the maximum dry density at the optimum moisture content as, determined by ASTM D 698.

B. Backfilling Pipe Trench
   1. After the pipe has been laid in the trench and has been inspected and approved, and backfilling in the pipe zone is complete and compacted, remainder of trench may be backfilled. The backfill material shall be select backfill material as defined in SECTION 02200 -EARTHWORK. Care shall be taken to ensure that no voids remain under, around or near the pipes.
   2. Compaction: The Contractor shall compact the select fine backfill material to 90 percent of the maximum dry density in accordance with SECTION 02200 - EARTHWORK.
   3. Compaction Equipment:
      a. Compaction equipment shall be of suitable type and adequate to obtain the compaction specified. Compaction equipment shall be operated in strict accordance with manufacturer's instructions and recommendations. Equipment shall be maintained in such condition that it shall deliver the manufacturer's rated compactive effort. If specified compaction is not obtained, larger and/or different types of additional equipment shall be provided by the Contractor to obtain specified compaction.

C. Surface reinstatement in asphalt paved roads shall be as specified in Section 02600 – ASPHALT PAVING AND SURFACING.

3.07 CLEAN UP

A. Upon completion of work in this section, the Contractor shall remove all rubbish and debris from the Site. The Contractor shall be solely responsible for collection, storage and disposal of all rubbish and debris resulting from the earthwork activities in compliance with all applicable local, state and federal regulations and requirements. The entire area involved shall be left in a neat, clean and acceptable condition.

END OF SECTION 02221

SECTION 02260

LANDFILL COVER CONSTRUCTION

PART 1 - GENERAL

1.01 DESCRIPTION

A. The work specified in this section consists of the labor, equipment, tools, materials, and services needed to perform the construction of the landfill cover layers described herein or as shown on the Drawings.

B. Work included in this section:
   1. Subgrade Fill Layer
   2. Geonet
   3. Geonet Protection Layer
   4. Geosynthetic Clay Liner
   5. Barrier Protection Layer
   6. Methane Collection System.

C. Related work specified in other sections:
   1. Section 02200 – Earthwork
   2. Section 02270 – Sediment and Erosion Control
   3. Section 02280 – Geosynthetics
   4. Section 02281 – Geosynthetic Clay Liner
   5. Section 02422 - Geonet
   6. Section 02821 – Landscaping

1.02 QUALITY ASSURANCE

A. The Contractor shall have successfully completed at least two landfills of equal or larger size, one of which involved the placement of a geosynthetic clay liner.

1.03 SUBMITTALS

A. Submit one series of certified quality control tests for each cover soil material for the Owner’s Representative's approval. Include a 50-pound sample and identify the source of each material. Resubmit as needed to obtain approval.

B. Submit a list of compaction equipment to be used including the manufacturer, model name and/or number, type, gross weight, and area loading.

C. Submit a list of at least two successfully completed projects of equal or larger size and or similar construction.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Material stockpiles shall be segregated by type of material and shall be stored and handled to prevent inclusion of objectionable material such as trash, debris, organic matter, unapproved materials, stones, ice, snow, or other materials.

PART 2 - PRODUCTS

2.01 SUBGRADE FILL LAYER

A. The subgrade fill layer shall meet the requirements of AASHTO Classification System Type A-2-4 soil.

2.02 GEONET

A. Geonet shall conform to the requirements stated in Section 02422 – GEONET.

2.03 GEONET PROTECTION LAYER

A. The geonet protection layer shall meet the requirements of AASHTO Classification System Type A-3 soil.

2.04 GEOSYNTHETIC CLAY LINER

A. Geosynthetic clay liner shall conform to the requirements stated in Section 02281 – GEOSYNTHETIC CLAY LINER.

2.05 BARRIER PROTECTION LAYER

A. The barrier protection layer shall meet the requirements of AASHTO Classification System Type A-2-4 soil.

2.06 METHANE COLLECTION SYSTEM

A. The material for methane collection system shall be new, without flaws or defects.

B. Comply with the sizes indicated on the Drawings. No substitution of smaller sizes are permitted. Larger sizes may be used subject to acceptance of the Owner's representative. Remove damaged and defective material.

C. Collection System

1. Continuous blanket shall consist of a Geonet that will be placed above the subgrade fill layer. The Geonet shall be in accordance with the specification SECTION 02422 – GEONET.

2. Collection trench shall be constructed with geotextiles. The geotextile shall be a minimum 6-ounce per square yard nonwoven needle punched synthetic fabric consisting of staple or continuous filament polyester or polypropylene manufactured in a manner accepted by the Engineer and the Owner. The Geotextiles shall be inert and unaffected by long-term exposure to chemicals or liquids with a pH range from 3 to 10. The granular material used in the trenches shall be #57 stone.
3. Perforated Gas Vent Pipe and Fittings - The gas vent pipe shall be 6-inch diameter Schedule 80 Polyvinyl Chloride (PVC) well screen (0.040" slot with a minimum opening area of 23 square inches per linear foot of screen). The source pipe for the PVC screen shall meet the requirements of ASTM D1785, Schedule 80. The PVC screen shall have threaded, gasketed (buna-N or viton), flush-joint connections and meet the requirement of ASTM F-480. Fittings shall have threaded, gasketed (buna-N or viton), flush-joint connections and be manufactured in accordance with ASTM F-480.

D. Methane Vent Riser Pipe and fittings – shall be 6-inch diameter Schedule 80 PVC pipe. The PVC pipe shall meet the requirement of ASTM D1785, Schedule 80, designation 1120, and the fiber stress for deriving the short-time burst pressure requirement in accordance with Table 6, therein, shall not be less than 6,000 psi at 73.4^{O}F. Fittings shall conform to the requirements of ASTM D2467, Class 12454-B for socket type and ASTM D2464 for threaded type. Fittings for double wall pipe shall be factory pre-fabricated.

PART 3 - EXECUTION

3.01 SUBGRADE PREPARATION

A. The subgrade elevations shown on the Drawings shall be achieved by the placement of fill material. Final subgrade elevations shall be a minimum of 24-inches above the landfill waste, in accordance with regulations for landfill closures.

B. Prior to construction of the cover layers, the subgrade shall be proof-rolled using a roller of not less than 23,000 pounds. The Owner's Representative shall observe the proof-rolling and also make determinations of unsuitable subgrades. Unsuitable subgrades shall be excavated in one-foot increments up to a maximum of three feet. The subgrade shall be proof-rolled and re-inspected by the Owner's Representative after each increment until accepted. The excavation shall be backfilled and compacted with select backfill material.

3.02 SEQUENCING AND SCHEDULING

A. The Contractor shall be responsible for the installation, sequencing, and ITL testing of all cover components.

B. The Contractor shall verify that the subgrade and each cover component has been properly installed, graded, tested, and had the test results accepted as required prior to

the installation of subsequent cover components. The Owner's Representative must approve the prior lift surface prior to the installation of subsequent lifts.

C. The Contractor shall be responsible for the layout and protection of a 50-foot survey grid system to be used for identifying all testing locations, seam locations, and panel locations, as required in individual specification services.

D. The Contractor shall notify the Owner's Representative a minimum of 24 hours in advance of required QA/QC testing.

3.03 INSTALLATION (GENERAL)

A. Each lift of ground protection, barrier protection of subgrade fill shall be placed and compacted in uniform lifts in accordance with Section 02200 – EARTHWORK. Employ compaction equipment and methods which will achieve the specified permeabilities and compaction.

B. Maintain proper grading and compaction of each cover layer to maintain drainage and prevent ponding. Areas compacted with a sheepfoot roller shall be smooth drum-rolled or back-bladed to a smooth surface each night to prevent infiltration and ponding and to maintain drainage.

C. Do not place materials on spongy, porous, wet or frozen ground or while in a frozen condition.

D. QA/QC testing shall be conducted in accordance with Section 01402 – CONSTRUCTION QUALITY ASSURANCE/QUALITY CONTROL PLAN.

END OF SECTION 02260

SECTION 02270

SEDIMENT AND EROSION CONTROL

PART 1 - GENERAL

1.01 DESCRIPTION

A. The Contractor shall obtain all necessary permits and provide labor, equipment, materials, tools, and other related items required to install temporary and permanent sediment and erosion control devices, in accordance with the procedures specified in Owner-approved Site Operation Plan (SOP) and as shown on the Drawings.

1.02 SECTION INCLUDES

A. Temporary erosion controls include, but are not limited to, silt fences, hay bales, grassing, mulching, seeding, watering, and reseeding on-site surfaces which will ensure that erosion during construction will be either eliminated or maintained within acceptable limits as established by the local, state, and federal regulations and requirements.

B. Temporary sedimentation controls include, but are not limited to, silt dams, traps, barriers, turbidity curtains, and appurtenances, which will ensure that sedimentation pollution will be either eliminated or minimized to acceptable limits as established by applicable regulations and requirements.

C. The Contractor shall be responsible for providing and maintaining effective temporary erosion and sediment control measures during construction or until permanent controls become effective.

D. The Contractor shall implement permanent erosion control measures to prevent sedimentation of the waterways and to prevent erosion of the Site.

E. Related work not included in this section:
   1. Section 02150 – Clearing And Grubbing
   2. Section 02200 – Earthwork
   3. Section 02280 – Geosynthetics
   4. Section 02821 – Landscaping

1.03 REFERENCE DOCUMENTS

A. Mississippi Department of Transportation (MDOT) Standard Specifications for Construction of Road and Bridges, latest edition.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Silt Fence

1. Fabric shall be Envirofence manufactured by Mirafi, Inc. or SiltStop manufactured by Amoco Fabrics, Inc., or an equivalent approved by the Owner or Owner's Representative.
2. The silt fence fabric shall conform to the physical requirements for Type II as specified in MDOT Section 714.13.2.
3. The fence posts shall be steel or wood that conform to the requirements of MDOT 714.13.2.2.
4. The wire woven backing shall be in accordance with MDOT Section 714.13.2.1.
5. The staples shall conform to requirements of MDOT 714.13.2.3.

B. Hay Bales

1. Hay bales shall be clean, seed-free cereal hay types.
2. Stakes capable of securing the bales in the designated locations shall be a minimum of 4 feet long with nominal cross-sectional dimensions of 1 inch by 2 inches.

C. Turbidity Curtains

1. Turbidity curtains shall be bright color (yellow or "international" orange are recommended).
2. The curtain fabric shall meet the following minimum requirements:

Physical Property	Requirement
Thickness	45 mil (0.045 inch)
Weight	18 ounces/yd^2
Grab Tensile Strength	300 pounds
UV Inhibitor	Shall be included

3. Seams in the fabric shall be either vulcanized welded or sewn, and shall develop the full strength of the fabric.
4. Floatation devices shall be flexible and contained in an individual floatation sleeve or collar attached to the curtain. Buoyancy provided by the floatation units shall be sufficient to support the weight of the curtain and maintain a freeboard of at least 3 inches above the water surface level.
5. Load lines shall be fabricated into the bottom of all floating turbidity curtains. The bottom load line shall consist of a chain incorporated into the bottom hem of the curtain of sufficient weight to serve as ballast to hold the curtain in a vertical position. Additional anchorage shall be provided as necessary. The load lines shall have suitable connecting devices which develop the full breaking strength for connecting to load lines in adjacent sections.

6. External anchors shall consist of wooden or metal stakes (2 x 4 inch) or 2.5-inch minimum diameter wood or 1.33 pounds/linear foot steel is used.

PART 3 - EXECUTION

3.01 GENERAL

A. Standards: The Contractor shall provide all materials and promptly take all actions necessary to achieve effective erosion and sedimentation control in accordance with Specifications.

B. Implementation: The requirements established in the Drawings and Specifications shall be considered a minimum requirement. The Contractor shall be responsible to actively take all steps necessary to prevent soil erosion and off-site sediment transport.

3.02 EROSION CONTROL MEASURES

A. Permanent erosion control measures shall be implemented as soon as practical before any land disturbance during the execution of the Work.

3.03 SILT FENCE

A. The silt fence shall be installed in accordance with the manufacturer's specifications and MDOT Section 714.13.2.

B. It shall be the responsibility of the Contractor to extend or upgrade sediment and erosion control devices, whenever overland flow off-site is imminent or is occurring, in order to prevent the off-site migration of sediment.

3.04 HAY BALES

A. Hay bales may be substituted for, or used to supplement the silt fence.

B. The Contractor shall stake hay bales securely in place so as to prevent off-site migration of sediment.

C. The Contractor shall stake each hay bale through its center, with the stakes embedded a minimum of one foot into ground.

3.05 TURBIDITY CURTAINS

A. The Contractor shall anchor the turbidity curtains to prevent any material from passing beneath the curtain.

B. The Contractor shall have a floatation system that will float if punctured or cut.

C. The turbidity curtain shall have sufficient slack to permit the curtain to rise to the maximum designed high water without being overtopped and still be in continuous contact with the bottom.

D. The Contractor shall secure the adjacent portions of the curtain secured so that a minimum of suspended soil particles will pass between the sections.

E. The Contractor shall repair or replace defective or damaged portions of the turbidity curtain at the direction of the Owner or Owner's Representative. At the completion of the project, the turbidity curtain shall be removed in such a manner so as to minimize release of soil adhering to the turbidity curtain.

3.06 MAINTENANCE

A. The Contractor shall be responsible for the proper installation and maintenance of all erosion and sedimentation control structures throughout the Work until the Work is completed.

B. The Contractor shall inspect all erosion and sedimentation controls after each storm event and on a weekly basis during the execution of the Work. A checklist will be kept by the Owner or Owner's Representative defining those controls requiring cleanout, repair, or replacement. The Contractor shall then rectify the noted deficiencies within two (2) working days of the date of written notification.

C. The Contractor shall maintain all erosion controls as specified and shall remove the accumulated sediments and disposed of as directed by the Owner or Owner's Representative.

3.07 REMOVAL

A. At the completion of the Work, and with the approval of the Owner, the Contractor shall remove all temporary silt fences, posts, hay bales, turbidity curtains, and shall restore the location to a condition that minimizes erosion or ponding of water, and is acceptable to Owner or Owner's Representative.

END OF SECTION 02270

SECTION 02280

GEOSYNTHETICS

PART 1 - GENERAL

1.01 DESCRIPTION

A. The Work includes supplying and installing geotextiles for the areas as shown on the Drawings.

1.02 SECTION INCLUDED

A. Specific responsibilities of the Contractor include: Procurement of geotextile products; transportation of geotextile materials to site; field handling, storing, deploying, seaming, temporary restraining, and all other aspects of geotextile installation.

B. Related work not included in this section:
   1. Section 02200 – Earthwork
   2. Section 02221 – Trench Excavation And Backfill
   3. Section 02270 – Sediment And Erosion Control
   4. Section 02281 - Geosynthetic Clay Liner
   5. Section 02422 - Geonet
   6. Section 02700 – Site Drainage

C. Pre-Installation: The Contractor shall submit the following in accordance with Section 01300 – SUBMITTALS:
   1. Origin and identification (brand name and number) of the geotextile material.
   2. Copies of quality control certificates.
   3. List of materials that comprise geotextiles, expressed as percent by weight.
   4. Manufacturer's specification that includes properties measured using appropriate test methods.
   5. Written certification that minimum values given in geotextile manufacturer's specification are guaranteed by geotextile manufacturer.
   6. For non-woven geotextiles, written certification that geotextile manufacturer has continuously inspected geotextile for presence of needles and found geotextiles to be needle-free.
   7. Quality control certificates, signed by a responsible entity employed by geotextile manufacturer. Each quality control certificate shall include applicable roll identification numbers, testing procedures, and results of quality control tests. At a minimum, results shall be given for tests and corresponding methods specified in Subpart 1.04 – Quality Assurance of this section.

D. Installation: The Contractor shall submit the following in accordance with Section 01300 – SUBMITTALS:

1. Geotextile material samples,
2. Geotextile material sample test results,
3. Geotextile installer's qualification,
4. Installation records, and
5. Construction QA/QC sample test results.

1.03 QUALITY ASSURANCE

A. Contractor shall be responsible for the following:

1. Exercise due care to assure procurement, storage, and placement of materials from off-site sources that will comply with the requirements, specifications, and standards set out herein.
2. During shipment and storage, the geotextile shall be protected from ultraviolet light exposure, precipitation or other inundation, mud, dirt, dust, puncture, cutting, or any other damaging or deleterious condition.
3. Geotextile rolls shall be shipped and stored in relatively opaque and watertight wrappings.
4. Ensure that each geotextile manufacturer that supplies materials under this Contract has an internal product quality control program that meets requirements of the Owner.
5. During installation, an Independent Testing Laboratory (ITL) shall be engaged by the Contractor, and shall be used to inspect and test all geotextile material placement. The Contractor shall bear the cost of retesting and reinspecting all work that fails to conform to the requirements set forth herein and on the Drawings.
7. Field and Laboratory testing will be conducted according to and at frequency specified in the Construction QA/QC Plan.

B. By Owner:

1. The Owner will review all materials testing and inspection results for accuracy, completeness and conformance with the requirements established in the Specifications and Drawings.

C. Applicable Criteria, Tests, and Standards:

1. The ITL and the Contractor shall use the most current version of the following tests for geotextiles:
   a. ASTM D1777 - Method for Measuring Thickness of Textile Materials (4 psf (0.2 kPa)).
   b. ASTM D3776 - Test Methods for Mass Per Unit Area (Weight) of Woven Fabric.
   c. ASTM D3786 - Test Method for Hydraulic Bursting Strength of Knitted Goods and Nonwoven Fabrics - Diaphragm Bursting Strength Tester Method.

d. ASTM D4355 - Test Method for Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus).
e. ASTM D4491 - Water Flow Rate, Permittivity, and Permeability.
f. ASTM D4533 - Test Method for Trapezoid Tearing Strength of Geotextiles.
g. ASTM D4751 - Apparent Opening Size (AOS).
h. ASTM D4632 - Test Method for Breaking Load and Elongation of Geotextiles (Grab Method).
i. ASTM D4643 - Moisture Content.
j. ASTM D4833 - Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products.
k. ASTM D5084 - Measurement of Hydraulic Conductivity (permeability) of Saturated Porous Materials Using a Flexible Wall Permeameter.
l. ASTM D5199 - Measuring Nominal Thickness of Geotextiles and Geomembranes.
m. ASTM D5321 - Determining the Coefficient of Soil and Geosynthetic or Geosynthetic and Friction by the Direct Shear Method.
n. ASTM D5887 - Measurement of Index Flux through Saturated Geosynthetic Clay Liner Specimens Using a Flexible Wall Permeameter.
o. ASTM D5890 - Swell Index of Clay Mineral Component of Geosynthetic Clay Liners.
p. ASTM D5891 - Fluid Loss of Clay Component of Geosynthetic Clay Liners.
q. ASTM D5993 - Measuring Mass Per Unit of Geosynthetic Clay Liners.

2. Testing will be conducted as specified in the Construction QA/QC Plan.

1.04 WARRANTY

A. Provide a written warranty upon Work completion as described in Section 01700 – CONTRACT CLOSEOUT. Warranty shall address the quality of material and workmanship.

PART 2 - PRODUCTS

2.01 GENERAL

A. Geotextiles shall comply with material specifications provided by geotextile supplier and manufacturer.

2.02 MATERIALS

A. Geotextile Separation Fabric shall be a non-woven polypropylene geotextile model 140N as manufactured by TC Mirafi, or approved equal.

PART 3 - EXECUTION

3.01 SUBGRADE PREPARATION

A. The Contractor shall grade the subgrade fill layer to the lines and grades as shown on the Drawings. The subgrade fill layer shall be prepared as specified in Section 02200 – EARTHWORK and Section 02260 – LANDFILL COVER CONSTURCTION.

3.02 GEOTEXTILE DEPLOYMENT

A. On slopes, the geotextiles shall be securely anchored and then rolled along or down slope in such a manner as to continually keep the geotextile sheet in tension.

B. A 5 feet minimum offset shall be maintained between adjacent roll ends during placement.

C. In the presence of wind or the placement in water, the geotextiles shall be weighted with sandbags or approved equivalent under replaced with cover material.

D. Geotextiles shall be cut using a cutter (hook blade) only. If in place, special care shall be taken to protect the geotextiles already in place.

E. A visual examination of the geotextile shall be carried out by the Contractor and Owner's Representative, after installation, to ensure that no potentially harmful foreign objects are present.

3.03 SEAMING AND OVERLAPPING PROCEDURES

A. Successive geotextile sheets shall be overlapped in such a manner that upstream sheet is placed over downstream sheet.

B. In underwater applications, the geotextile and required thickness of the backfill material shall be placed same day. The back fill shall begin at toe and proceed up slope.

C. Prior to seaming, the geotextiles shall be overlapped a minimum of 12 inches except when placed under water where the overlap shall be a minimum of 3 feet. The end of roll overlap shall be a minimum of 2 feet.

D. Sewing shall be continuous and be done using polymeric thread with chemical and ultraviolet light resistance equal to or exceeding those of geotextile.

E. A geotextile patch shall be placed over the damaged area and extend 3 feet beyond perimeter of tear or damage. In addition, seam sealing shall be done on all geotextile patches, as appropriate.

F. The Contractor shall install the geotextiles in the areas as shown on Drawings and according to the manufacturer's recommended procedures, as reviewed by the Owner's Representative.

3.04 GEOTEXTILE ACCEPTANCE

A. Contractor retains ownership and responsibility for geotextiles installed at the Site until accepted by Owner or Owner's Representative. At Owner or Owner's Representative discretion, the geotextile system may be accepted in sections or at points of substantial completion.

B. Owner will accept geotextiles when the following are completed:
   1. Installation of geotextiles, or section thereof.
   2. Documentation of installation.
   3. Verification of adequacy of field seams and repairs including associated testing.
   4. Recommended acceptance by Owner's Representative.

END OF SECTION 02280

SECTION 02281

GEOSYNTHETIC CLAY LINER

PART 1 - GENERAL

1.01 DESCRIPTION

A. This section describes the requirements for the furnishing and installation of the geosynthetic clay liner (GCL). All materials used shall meet the requirements of this section and all work shall be performed in accordance with the procedures provided herein.

B. The Contractor shall be responsible for the procurement, transportation to the Site, field handling, storing, deploying, installation, seaming, temporary restraining and repair of GCL, and all other aspects of GCL installation. The Contractor shall be responsible for meeting the specified requirements for safety, reliability, and performance.

1.02 SECTION INCLUDES

A. This section includes the following subparts:

1.01 Description
1.02 Section Includes
1.03 Submittals
1.04 Quality Assurance
1.05 Warranty
2.01 Materials
2.02 Packaging and Labeling
3.01 Subgrade Preparation
3.02 Installation
3.03 Seaming
3.04 GCL Repair
3.05 Covering
3.06 Acceptance

1.03 SUBMITTALS

A. Pre-Installation:

1. Manufacturer's certification for the bentonite clay or equivalent used in GCL production, and the granular bentonite, bentonite sealing compound or equivalent used for seaming, penetration sealing, and repairs. The certification shall demonstrate that the bentonite, bentonite sealing compound or equivalent shall, at a minimum, meet the manufacturer's specifications for the GCL with a permeability of $\leq 1x10^{-10}$ centimeter per second (cm/s).

2. Copies of quality control certificates issued by the GCL manufacturer for the GCL material delivered to the Site. The quality control certificates shall be signed by a responsible entity employed by the GCL manufacturer. Each quality control certificate shall include applicable roll identification numbers, testing procedures, and results of quality control tests. At a minimum, results shall be given for tests and corresponding methods specified in Subpart 1.04 - QUALITY ASSURANCE of this section.
3. Written certification that minimum values given in GCL manufacturer's specification are guaranteed by GCL manufacturer.

B. Installation:
1. The Contractor shall submit the following to the Owner's Representative:
   a. GCL material samples,
   b. GCL installers' qualification, and
   c. GCL installation records.
2. All submittals shall be in accordance with Section 01300-SUBMITTALS.

1.04 QUALITY ASSURANCE

A. The Contractor shall be responsible for the following:
1. Exercise due care to assure procurement, storage and placement of materials from off-site sources that will comply with manufacturer's specifications, and requirements, specifications, and standards set out herein.
2. Ensure that each GCL manufacturer that supplies materials under this Contract has an internal product quality control program.
3. During installation, an Independent Testing Laboratory (ITL), engaged by the Contractor, will be used to inspect and test all GCL material placement. Costs for all such inspections and tests will be paid by the Contractor. The Contractor shall bear the cost of retesting and reinspecting all work that fails to conform to requirements set forth herein and on the Drawings.
4. Field and Laboratory testing will be conducted according to and at the frequency specified in the Construction QA/QC Plan and in accordance with Section 01402 – CONSTRUCTION QUALITY ASSURANCE/QUALITY CONTROL PLAN.
5. Testing results and daily inspection reports prepared by the ITL shall be furnished to the Owner's Representative for review and to determine the conformance and completeness of the work. Test results and daily inspection reports shall be reviewed by the Owner's Representative no later than one day after the test results are obtained from the ITL.

B. The Owner will be responsible for the following:
1. The Owner will review all materials testing and inspection results for accuracy, completeness, and conformance with requirements established in the Specifications and Drawings.

C. Applicable Criteria, Tests, and Standards:

1. The GCL shall be analyzed using the most current version of the tests listed in the following table:

Test Method	Material Property	Acceptance Criteria
ASTM D 5993	Bentonite Mass/Area	At a minimum, manufacturer specified value
ASTM D 4632	GCL Grab Strength and GCL Peel Strength	At a minimum, manufacturer specified values
ASTM D 5084	GCL Permeability	Less than or equal to $1x10^{-10}$ cm/s

2. Testing shall be conducted as specified in the Construction QA/QC Plan and in accordance with Section 01402 – CONSTRUCTION QUALITY ASSURANCE/QUALITY CONTROL PLAN.

1.05 WARRANTY

A. Provide a written warranty upon Work completion as required in Contract Documents. It shall address the quality of material and workmanship.

PART 2 - PRODUCTS

2.01 MATERIALS

A. GCL shall be bentonite clay placed within geosynthetic materials and shall comply with requirements of permeability of $\leq 1 \times 10^{-10}$ cm/sec and a minimum thickness of greater than 6 millimeters (mm).

B. The granular bentonite or bentonite sealing compound used for seaming, penetration sealing, and repairs shall be made from the same material as used in the GCL and shall be as recommended by the GCL manufacturer.

2.02 PACKAGING AND LABELING

A. GCL rolls shall be packaged in packaging material that is resistant to photodegradation of by ultraviolet (UV) light.

B. GCL rolls shall be labeled with product identification information including the manufacturer's name, product code, lot number, roll number, roll dimensions, and roll weight.

PART 3 - EXECUTION

3.01 SUBGRADE PREPARATION

A. The Contractor shall grade the ground surface upon which the GCL is installed to lines and grades as shown on the Drawings.

B. The geonet protection layer upon which the GCL is installed shall be prepared and compacted as specified in Section 02260 – LANDFILL COVER CONSTRUCTION and Section 02200 - EARTHWORK. The surface shall be smooth, firm, and unyielding, and free of the following:

1. Vegetation,
2. Construction Debris,
3. Sticks,
4. Sharp rocks,
5. Void spaces,
6. Standing water,
7. Cracks larger than one-quarter inch (6 mm) in width, and
8. Any other foreign matter.

C. Prior to GCL placement, the Contractor shall smooth-roll fill material surface receiving the GCL to eliminate voids or cracks, wheel ruts, footprints or other irregularities that may exist in geonet protection layer.

3.02 INSTALLATION

A. The Contractor shall install GCL over the areas as shown on Drawings and according to the manufacturer's recommended procedures, as reviewed by the Owner’s Representative.

B. Immediately prior to deployment of GCL, the Contractor shall carefully remove GCL packaging without damaging GCL.

C. The Contractor shall comply with the manufacturer's recommendations for orientation of the GCL (i.e., which side faces up).

D. The Contractor shall not park or operate any equipment that could damage the GCL on the deployed or installed GCL. If the GCL installation equipment causes subgrade conditions that are not in compliance with requirements of Subpart 3.01 of this section, or Section 02200-EARTHWORK, the Contractor shall restore the geonet protection layer to the requirements of Contract Documents before continuing with installation of GCL.

E. To avoid damage to bottom surface of the GCL, the Contractor shall not drag GCL across the geonet protection layer during GCL installation. The Contractor shall use a temporary geosynthetic subgrade covering such as a slip sheet or rub sheet to reduce friction damage during placement, when potential for friction damage is present.

F. The Contractor shall place GCL seams parallel to the direction of the slope. Seams should be located at least 3 feet from the toe and crest of slopes.

G. The Contractor shall place the GCL in an anchor trench located around the perimeter of the landfill. The GCL shall be anchored as shown on the drawings.

H. The Contractor shall place GCL panels to lie flat on the underlying surface, with no wrinkles or fold, especially at exposed edges of panels.

I. The Contractor shall only deploy as much GCL as can be covered at the end of the working day with soil, or a temporary waterproof tarpaulin. The GCL shall not be left uncovered overnight.

J. The Contractor shall not deploy GCL during rain events. The Contractor shall remove and replace, at no additional cost to the Owner, the portions of GCL that are hydrated without specified soil cover.

3.03 SEAMING

A. The Contractor shall construct the GCL seams by overlapping the adjacent edges of GCL panels. The Contractor shall remove any loose soil or other debris from the overlap zone.

B. The minimum dimension of the longitudinal overlap shall be 6 inches. The minimum overlap for end-of-roll seams shall be 24 inches.

C. The Contractor shall construct the seams at the ends of the panels such that they are shingled in the direction of the grade to prevent the potential for runoff flow to enter the overlap zone.

D. The Contractor shall place granular bentonite or bentonite sealing compound, if the GCL has one or more non-woven needle punched geotextiles. A continuous bead of granular bentonite or bentonite sealing compound shall be applied along the longitudinal and end-of-roll overlap zone of the GCL seams. The bentonite shall be applied at a minimum application rate of one quarter pound per linear foot.

3.04 GCL REPAIR

A. GCL shall be considered damaged if it is torn, punctured, or perforated.

B. The Contractor shall remove, and replace or repair the damaged GCL at no additional cost to the Owner.

C. The Contractor shall repair the damaged and removed GCL by placing a patch to fit over the damaged area. The patch shall be obtained from a new GCL roll and shall be cut to size such that a minimum overlap of 12 inches is achieved around all of the damaged area. The Contractor shall place dry bentonite or bentonite sealing compound around damaged area prior to placement of patch.

D. The Contractor shall affix the patch in place so that the patch is not displaced during soil cover placement.

3.05 COVERING

GCL shall not be covered prior to inspection and approval by the Owner's Representative. The GCL shall be covered with a minimum of 18 inches of barrier protection layer followed by 6 inches of top soil. The backfill for barrier protection layer shall be free of angular stones or other foreign matter that could damage the GCL. The backfill shall be placed preventing soil from entering the GCL overlap zone and tensile stress from being mobilized in the GCL. The barrier protection layer requirements are described in Section 02260 – LANDFILL COVER CONSTRUCTION.

3.06 ACCEPTANCE

A. The Contractor retains ownership and responsibility for the GCL installed at the Site until accepted by Owner. At Owner's discretion, the GCL may be accepted in sections or at points of substantial completion.

B. The Owner will accept GCL when the following are completed:
   1. Installation of GCL, or section thereof,
   2. Documentation of installation,
   3. Verification of adequacy of GCL material, field seams, and repairs including associated testing, and
   4. Recommended acceptance by Owner's Representative.

END OF SECTION 02281

SECTION 02422

GEONET

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Composite Geonet

1.02 RELATED SECTIONS

A. Section 02280 - Geosynthetics

1.03 REFERENCES

A. Quality Control Testing Standards
   1. ASTM D4716 - Transmissivity
   2. ASTM D3776 - Mass Per Unit Area of Woven Fabric.
   3. ASTM D3786 - Hydraulic Bursting Strength of Knitted Goods and Non-Woven Fabrics.
   4. ASTM D4354 - Sampling of Geosynthetics for Testing.
   5. ASTM D4491 - Water Permeability of Geotextiles by Permitivity.
   6. ASTM D4594 - Effects of Temperature on Stability of Geotextiles.
   7. ASTM D4595 - Tensile Properties of Geotextiles by the Wide Width Strip Method.
   8. ASTM D4632 - Breaking Load and Elongation of Geotextiles (Grab Method).
   9. ASTM D4751 - Determining Apparent Opening Size of a Geotextile.
   10. ASTM D4833 - Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products.
   11. ASTM D2256 - Tensile Strength Geonet.
   12. ASTM D1777 - Thickness.
   13. GRiGN1 - Compression of Geonet.

1.04 SUBMITTALS

A. Submit a one-foot square sample of each geonet proposed for use on this project.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Store geonet out of the elements and protect from abrasion, puncture or tearing or exposure to sunlight.

B. Mark rolls clearly showing the type of fabric and manufacturer.

C. Handling of the geonet rolls shall be based on the manufacturer's recommendations.

PART 2 - MATERIALS AND PRODUCTS

2.01 MATERIALS

A. Composite Geonet
   1. Shall consist of a polypropylene or polyethylene venting/drainage netting with a 6 oz./yd^2 (minimum), non-woven filter fabric bonded to both surfaces of the drainage/venting netting.
   2. Product and Manufacturer
      a. GSE FabriCap;
      b. or approved equal.

PART 3 - EXECUTION

3.01 INSPECTION

A. The Contractor shall inspect all geonet upon delivery and verify that proper materials and quantities have been supplied.

B. The Contractor shall inspect the subgrade for protrusions or other unacceptable conditions prior to installation of geonet.

3.02 SUBGRADE PREPARATION

A. The subgrade fill layer shall be prepared as indicated in Section 02200 – EARTHWORK and Section 02260 – LANDFILL COVER CONSTRUCTION.

3.03 PROTECTION

A. Protect all geonet materials from damage due to exposure to sunlight, dirt, dust, and other hazards.

B. Maintain the protective wrapping on geonet rolls at all times prior to actual deployment.

C. The geonet shall be covered within 10 days after installation.

D. During spreading operations of backfill, a minimum depth of 12 inches of soil shall be maintained by construction equipment passing over the geonet unless a lesser thickness is specifically authorized by the Field Engineer. Construction equipment shall not operate directly on geotextile and geonet.

3.04 PLACEMENT

A. Geonet rolls shall be positioned as required and unrolled.

B. When placed on prepared subgrade, geonet shall be overlapped a minimum of one foot on all edges.

C. When geonet is placed on slopes steeper than 1V:5H, longitudinal seams shall be wired together and overlapped a minimum of two feet.

D. Geonet rolls shall be cut and laid flat such that buckling of geonet does not occur.

E. If net is damaged during any phase of construction or installation, a new piece of the same type shall be cut and placed over the damaged area with a two-foot minimum overlap and fastened or wired together in accordance with manufacturers recommendations.

F. Cover material shall be spread in direction of overlap wherever possible.

END OF SECTION 02422

SECTION 02600

ASPHALT PAVING AND SURFACING

PART 1 - GENERAL

1.01 SCOPE

A. The work under this Section includes, but it is not necessarily limited to, the furnishing and installation of all asphalt paving materials and pavement base materials as indicated on the Drawings and as necessary for the proper performance of this Work.

B. Related Work Specified Elsewhere:
   1. Section 02200 – Earthwork

1.02 SUBMITTALS

A. Submit data in accordance with the requirements of the Section 01300 - SUBMITTALS.
   1. Batch design.
   2. Density and viscosity tests on each run.
   3. Weight slips for pavement base and asphalt paving materials.
   4. Aggregate sieve analysis report.

1.03 QUALITY ASSURANCE

A. Unless otherwise indicated on the Drawings or herein specified, all work under this Section shall be performed in accordance with the current Mississippi Department of Transportation (DOT) Standard Specifications.

B. Furnish weight slips for all material incorporated in the Project to verify that required tonnage has been applied.

1.04 PRODUCT HANDLING

A. Protection: Use all means necessary to protect materials of this Section before, during, and after installation and to protect installed work and materials of other trades.

B. Replacement: In the event of damage, immediately make all repairs and replacements necessary to gain the approval of the Owner's Representative at no additional cost.

PART 2 - PRODUCTS

2.01 MATERIAL

A. General: All materials and products for the work under this Section shall conform to the current Mississippi DOT Standard Specification Section 401 except as otherwise specified herein.

B. Graded Aggregate Base: Per material specifications described in Section 02200 – EARTHWORK.

C. Base: The base course for all paved roadways shall conform to the requirements of Mississippi DOT Specifications for the Hot Mix Asphalt, Sections 907-401.

D. Surface Course: The surface course for all shall conform to requirements of Mississippi DOT Specifications for Hot Mix Asphalt Pavement, Section 907-401.

E. Prime and tack coats shall be in accordance with Section 907-401 of Mississippi DOT Standard Specifications.

PART 3 - EXECUTION

3.01 EXCAVATION, FILLING, AND GRADING

A. Perform excavating and filling in accordance with Section 02200 – EARTHWORK.

3.02 INSTALLATION

A. Asphalt construction shall be performed in accordance with Section 907-403 of Mississippi DOT "Standard Specifications for Road and Bridge Construction".

B. Place each course in the required quantities so that when compacted, they will conform to the indicated grade, cross section, and minimum thickness as specified or indicated on the Drawings.

3.03 CLEANING

A. Prior to acceptance of the Work of this Section, clean the pavement and related areas to the satisfaction of the Owner or Owner's Representative.

END OF SECTION 02600

SECTION 02700

SITE DRAINAGE

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. This section covers the work necessary for control of run-on during site activities.

B. Related work not included in this section:
   1. Section 01300 – Submittals
   2. Section 02200 – Earthwork
   3. Section 02270 – Sediment and Erosion Control
   4. Section 02280 – Geosynthetics

1.02 REFERENCE DOCUMENTS

A. American Association of State Highway and Transportation Officials (AASHTO) most current version.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Select Fine Backfill: shall conform to the specifications described in Section 02200 – EARTHWORK.

PART 3 - EXECUTION

3.01 OFF-SITE DRAINAGE

A. Off-site drainage shall be directed around the Site by construction of swales and berms as necessary to prevent the movement of water from entering Site.

3.02 SITE DRAINAGE

A. The landfill cover including subgrade fill layer, geonet protection layer, barrier protection layer, and top soil shall be placed, graded and compacted to the lines and grades as shown on the Drawings for proper site drainage.

END OF SECTION 02700

SECTION 02720

STORM DRAINAGE SYSTEM

PART 1 - GENERAL

1.01 DESCRIPTION: Provide labor, equipment, tools, materials, and services for the installation of storm drains as described herein or shown on the Drawings.

1.02 SECTION INCLUDES

A. This section covers the work necessary for the construction of concrete storm drains. Included will be supply and installation of concrete pipes, manholes, fittings, inlets, drop inlets, and outfall structures at locations shown on the Drawings.

B. Related work not included in this section:
   1. Section 02110 - Demolition
   2. Section 02200 - Earthwork
   3. Section 02221 – Trench Excavation, and Backfill
   4. Section 03310 – Forms, Concrete, and Reinforcements

1.03 REFERENCE DOCUMENTS:

A. Mississippi Department of Transportation (MDOT) Standard Specifications for Construction of Road and Bridges, latest edition.

B. Prestressed Concrete Institute: Manual for Quality Control for Plants and Production of Precast and Prestressed Concrete Products.

C. National Precast Concrete Association: Quality Control Manual for Precast Concrete Plants.

D. American Society for Testing and Materials:
   1. ASTM A82 – Specification for Steel Wire, Plain for Concrete Reinforcement.
   2. ASTM A185 – Specification for Steel Welded Wire Fabric, Plain for Concrete Reinforcement.
   3. ASTM A615 – Specification for Deformed and Plain Billet – Steel Bars for Concrete Reinforcement.
   4. ASTM C33 – Specification for Concrete Aggregates.
   5. ASTM C260 – Specification for Air-Entraining Admixtures for Concrete.
   6. ASTM C478 – Precast Reinforced Concrete Manhole Sections.
   7. ASTM C494 – Specification for Chemical Admixtures for Concrete.
   8. ASTM C881 – Specification for Epoxy-Resin Board Binding Systems for Concrete.

9. ASTM C890 – Standard Practice for Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures.
10. ASTM C891 – Standard Practice for Installation of Underground Precast Concrete Utility Structures.
11. ASTM C923 – Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals,
12. ASTM C913 – Standard Specifications for Precast Concrete Water and Wastewater Structures.

C. American Association of State Highway and Transportation Officials: Standard Specifications for Joints for Circular Concrete Sewer and Culvert Pipe Using Flexible Watertight Gaskets (AASHTO M198).

D. American Concrete Institute: Building Code Requirements for Reinforced Concrete (ACI 318).

E. Occupational Safety and Health Administration: Standard 1926.704 – Requirements for Precast Concrete.

1.04 SUBMITTALS

A. The Contractor shall submit shop drawings for precast reinforced concrete pipes, manholes, frames, grates, covers, inlets, and other structures as needed for completion of the Work.

B. The Contractor shall provide manufacturer's data on each product finished including technical and test data to comply with specifications, installation recommendations, and storage and handling requirements.

C. The Contractor shall submit all inspection and test reports specified in Subpart 3.08 – Field Quality Control.

D. The Contractor shall provide submittals in accordance with the requirements of Section 01300 – SUBMITTALS.

1.05 DELIVERY, STORAGE, AND HANDLING

A. The Contractor shall handle and store materials to prevent damage to coatings and linings and in accordance with manufacturer's specifications.

B. The Contractor shall provide gaskets and jointing materials in separate, clearly marked packaging protected from sunlight and atmospheric deterioration.

1.06 PROJECT CONDITIONS

A. Site Information: Verify existing utility locations.

B. Locate existing structures and piping to be abandoned, or demolished and removed.

C. The Contractor shall be responsible for ascertaining from his own inspection of the Site and the respective utility authorities all mains, pipes, and cables whether underground or overhead. The Contractor shall prepare and protect the existing utilities for continued service during and after the performance of the Work.

D. Where excavation is carried out close to sewers, pipes, cables, or other services, the Contractor shall provide temporary supports or slings. Where such sewer, pipe, cable, or other service is temporarily disturbed, it shall be repaired or replaced to the satisfaction of the Owner's Representative at no cost to the Owner.

PART 2 – PRODUCTS

2.01 MATERIALS

A. PIPES AND FITTINGS

1. Reinforced-Concrete Sewer Pipe and Fittings: ASTM C 76 (ASTM C 76M), Class III, Wall B, for gasketed joints.
   a. Pipe Sections: Minimum length shall be 8 feet, except where shorter lengths are required to meet special conditions. Maximum lengths shall be 20 feet.
   b. Joints
      1) Gasket Type: ASTM C 433, rubber.
      2) Engineering Fabric: Geotextile Filter Fabric as specified in SECTION 02280 – GEOSYNTHETICS.
   c. Type: Bell and Spigot
   d. Portland Cement: ASTM C 150, Type II.
   e. Markings: Clearly mark on each pipe section: design load strength, internal diameter, name of manufacturer, and date of manufacture.

B. STORMWATER INLET

1. Precast Concrete Manholes: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for rubber gasket joints.
   a. Ballast: Increase thickness of precast concrete sections or add concrete to base section, as required to prevent floatation.
   b. Base Section: 12-inch minimum thickness for floor slab with 12 inch overhand and 12-inch minimum thickness for walls and base riser section, and having a separate base slab or base section with integral floor.
   c. Riser Section: 4-inch minimum thickness, 48-inch diameter, and lengths to provide depth indicated.
   d. Top Section: Eccentric cone shape, unless concentric cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.
   e. Joint: Gaskets – ASTM C 443, rubber.

f. Grade Rings: Include 2 or 3 reinforced concrete rings, of 6- to 9-inch total thickness, that match a 24-inch-diameter frame and cover.

g. Steps: ASTM C478 individual steps or ladder.

h. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.

i. Manhole Frames and Covers: ASTM A 536, Grade 60-40-18, heavy-duty ductile iron. Include 24-inch inside diameter by 7- to 9-inch riser with 4-inch minimum with flange, and 26-inch-diameter cover.

j. Frames and Grates: ASTM A 536, Grade 80-55-06, heavy-duty ductile iron, frames and flat grates, Mississippi DOT Grate No. 2, of dimensions indicated on drawings.

E. PROTECTIVE COATINGS

1. General: Include factory- or field-applied protective coatings to structures and appurtenances according to the following:

2. Coating: 1- or 2-coat, coal-tar epoxy, 15-mil minimum thickness, except where otherwise indicated.

a. Pipes: On exterior surfaces.

b. Storm Water Inlets: On exterior surfaces.

c. Storm Water Inlet Frames and Grates: On entire surfaces.

F. OUTFALLS

1. Flared end sections, apron, and tapered sides of pre-case, reinforced concrete.

2. Concrete for pipe outlet supports as specified in Section 03310 – FORMS, CONCRETE, AND REINFORCEMENT.

3. Riprap: As specified in Section 02200 – EARTHWORK.

PART 3- EXECUTION

3.01 GENERAL

A. Excavating, trenching, and backfilling are specified in Section 02221 – TRENCH EXCAVATION AND BACKFILL.

B. Do not lay pipe in water. Divert and drain water in trenches during construction.

3.02 GENERAL PIPE INSTALLATION REQUIREMENTS

A. General Locations and Arrangements: Drawings indicate the general location and arrangement of underground concrete drainage piping. Location and arrangement of piping layout take into account many design considerations. Install piping as indicated, to extent practical.

B. Changes in Line and Grade

1. In the event obstructions not shown on the plan are encountered during progress of the Work which will require alterations to the plans, the Contractor shall immediately bring such conditions to the attention of the Owner's Representative.
2. The Contractor shall not make any deviation from the specified line and grade without approval by the Owner's Representative.
3. Should any deviation in line and grade be permitted by the Owner's Representative in order to reduce the amount of rock excavation or for other similar convenience to the Contractor, any additional costs for extra pipe footage, concrete, sewer structures, or other additional costs shall be borne by the Contractor.

C. Installing Pipe

1. The Contractor shall furnish all necessary facilities for lowering and placing sections of the pipe in the trench without damage and shall property install the pipe.
2. The section of pipe shall be fitted together correctly and laid true to the line and grades as shown in the Drawings.
3. The full length of the barrel shall have a uniform bearing upon the bedding material, but if the pipe has a projecting bell, suitable excavation shall be made to receive the bell, which shall not bear on the subgrade.
4. The requirement for closely fitting the bottom of the pipe to the bedding material for the width shown on the Drawings will be strictly enforced.
5. The pipe shall be laid up grade. Any pipe, which is not in true alignment, both vertical and horizontal, or shows any undue settlement after laying shall be replaced when so ordered by the Owner's Representative. No pipe shall be laid when damaged, cracked, checked, or spalled or has any other defect deemed by the Owner's Representative to make it unacceptable, and all such sections shall be permanently removed from the Work.
6. The Contractor shall install piping beginning at low point of systems, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's recommendations for use of lubricants, cements, and other installation requirements. Maintain swab or drag in line and pull past each joint as it is completed.
7. At all times when the work of installing the pie is not in progress, all openings into the ends of the pipelines shall be kept tightly closed with suitable plywood or sheet metal bulkheads to prevent the entrance of animals and foreign materials and to prevent water from entering the pipe.
8. The Contractor shall keep the pipe trench free from water at all times and take necessary precautions to prevent the pipe from floating due to water entering the trench from any source. Damage occurring from water flowing into the trench is the Contractor's full responsibility. Restore and replace the pipe to its specified condition and grade if is displaced due to floating.
9. All pipeline adjoining concrete structures shall have a joint within 18 inches from the face of such concrete structures.

10. Use proper size increasers, reduces, and couplings, where different sizes or materials of pipes and fittings are connected. Reduction of the size of piping in the direction of flow is prohibited.
11. Install gravity-flow-systems piping at constant slope between points and elevations indicated on the Drawings. Install straight piping runs at constant slope, not less than that specified, where slope is not indicated.

3.03 PIPE JOINT CONSTRUCTION AND INSTALLATION

A. General: Join and install pipe and fittings according to the following:
   1. Concrete Pipe and Fittings: Install according to ACPA "Concrete Pipe Handbook." Use the following seals:
      a. Round Pipe and Fittings
         1) ASTM C 443, rubber gaskets.
         2) Engineering Fabric: Geotextile Filter Fabric as specified in Section 02280 – GEOSYNTHETICS.

B. System Piping Joints: Make joints using system manufacturer's couplings, except where otherwise specified.

C. All joints shall be wrapped with geotextile filter fabric. The wrappings shall be 18 inches wide and be continuously wrapped around the joint for two revolutions.

D. Join piping made of different materials or dimensions with couplings made for this application. Use couplings that are compatible with and fit both systems materials and dimensions.

3.04 STORM DRAINAGE INLET AND OUTFALL INSTALLATION

A. Install concrete supports under the two final sections of pie at the outfall structures as shown on the Drawings.

B. Construct outfall sections, aprons, and sides of reinforced concrete, as shown on the Drawings.

C. Construct riprap as shown on the Drawings.

D. Install outlets that spill onto grade, with end sections that match pipe.

3.05 CONCRETE PLACEMENT: Place cast-in-place concrete as necessary according to SECTION 03310 – FORMS, CONCRETE, AND REINFORCEMENT.

3.06 FIELD QUALITY CONTROL

A. Clear interior of piping and structures of dirt and superfluous material as the work progresses. Maintain swab or drag in piping and pull past each joint as it is completed.
   1. In large, accessible piping, brushes and brooms may be used for cleaning.

2. Place plug in end of incomplete piping at end of day and whenever work stops.
3. Flush piping between manholes and other structures, if required by authorities having jurisdiction, to remove collected debris.

B. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of the Project.
   1. Submit separate reports for each system inspection.
   2. Defects requiring correction include the following:
      a. Alignment: Less than full diameter of inside of pipe is visual between structures.
      b. Deflection: Flexible piping with deflection that prevents passage of a ball or cylinder of a size not less than 92.5 percent of piping diameter.
      c. Crushed, broken, cracked, or otherwise damaged piping.
      d. Infiltration: Water leakage into piping.
      e. Exfiltration: Water leakage from or around piping.
   3. Replace defective piping using new materials and repeat inspections until defects are within allowances specified.
   4. Reinspect and repeat procedures until results are satisfactory.

END OF SECTION 02720

SECTION 02810

IRRIGATION SYSTEM

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work of this section includes, but is not limited to:
   1. Automatic irrigation system including piping, fittings, sprinkler heads, and accessories.
   2. Valves, backflow preventers, and fittings.
   3. Controllers and Control wire.
   4. Testing.
   5. Excavating and backfilling irrigation system trenches.
   6. Associated interior and exterior plumbing, and accessories to complete the system.
   7. Pipe sleeves.

B. Related Work Specified Elsewhere:
   1. Section 02200 – Earthwork
   2. Section 02821 – Landscaping

1.02 SUBMITTALS

A. Submit manufacturer's product data and installation instructions for each of the system components.

B. Submit plans drawn by a certified irrigation designer for the irrigation system for review prior to installation. Include piping layout and details illustrating location and types of sprinkler heads, valves, control system and wiring, and list of fittings. Show sprinkler head coverage.

C. Record drawing: Provide irrigation system record drawings including legible markings to record actual construction, indication of horizontal and vertical locations referenced to permanent surface improvements, and identification of field changes of dimensions and details and changes made by Change Order.

1.03 QUALITY ASSURANCE

A. Applicable standards: Standards of the following as referenced herein:
   1. American Society of Testing and Materials (ASTM)
   2. National Electrical Code (NEC)
   3. National Sanitation Foundation (NSF)
   4. The Irrigation Association (IA)

B. Designer Qualifications: The designer shall be familiar with designing irrigation system included in this section and as shown on the Drawings. The designer shall have completed at least 20 successful designs similar in scope to work included in this section. Furnish to the Owner and/or Owner's Representative a written list of the 20 designs described above, including project location, client name, contact name, contact phone number, and date of design.

C. Installer's qualifications: The installer shall be familiar with the installation of an irrigation system as designed for Landfill 3 cover. The installer shall have completed at least 10 successful, in-service installations similar in scope to work included in this section. Furnish to the Owner and/or Owner's Representative a written list of the 10 installations described above, including project location, client name, contact name, contact phone number, and date of installation.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver irrigation system components in manufacturer's original undamaged and unopened containers with labels intact and legible.

B. Deliver plastic piping in bundles, packaged to provide adequate protection of threaded and plain pipe ends.

C. Store and handle materials to prevent damage and deterioration.

D. Provide secure, locked storage for valves, sprinkler heads, and similar components to prevent installation delays.

1.05 JOB CONDITIONS

A. Verify location of above and below grade utility lines.

B. Protect existing trees, plants, lawns, and other features designated to remain.

C. Repair damage to adjacent facilities caused by irrigation system work operations at no additional cost to Owner.

D. Notify Owner's Representative of unexpected subsurface conditions before proceeding with work.

E. Irrigation system layout is diagrammatic. Establish exact locations of piping, sprinkler heads, valves, and other components in the field at time of installation.
   1. Space sprinkler components as indicated.
   2. Make minor adjustments in system layout to clear existing fixed obstructions. Final system layout will be acceptable to Owner.

F. Cutting and patching:
   1. Core drill concrete and masonry. Jackhammers are not permitted.
   2. Materials and finishes for patching shall match existing cut surface materials and finish. Provide patching at openings in exterior walls watertight.

1.06 WARRANTY

A. Warrant fully operational automatic irrigation system for a period of one year from Date of Final Acceptance.

B. Warranty shall not include damage to the system due to fires, lightning storms, extreme cold and severe weather conditions not typical of planting area, acts of vandalism or negligence of the part of the Owner.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Rain Bird International, Inc., Glendora, Ca. and Toro Irrigation Division, Riverside, Ca.

2.02 MATERIALS

A. Provide only new materials, without flaws or defects.

B. Comply with pipe sizes indicated. No substitution of smaller pipes will be permitted. Larger sizes may be used subject to acceptance of the Owner's Representative. Remove damaged and defective pipe.

C. Provide pipe continuously and permanently marked with manufacturer's name or trademark, size, schedule and type of pipe, working pressure at 73 ºF. and NSF approval.

D. Plastic pipe, fittings, and connections:
   1. Polyvinyl chloride pipe: SDR 26, Class 160, ASTM D2242-81, rigid, extruded unplasticized, virgin PVC, homogeneous throughout and free from visible cracks, holes, foreign materials, blisters, wrinkles, and dents.
   2. Polyethylene pipe: ASTM D2239-99 flexible polyethylene pipe rated at 100 psi minimum working pressure.
   3. PVC pipe fittings: ASTM D2241-86 schedule 40 PVC molded fittings suitable for solvent weld, slip joint ring-tight seal, or screwed connections.
      a. Size slip fitting socket taper to permit a dry unsoftened pipe end to be inserted no more than halfway into the socket. Saddle and cross fittings are not permitted.
      b. Schedule 80 PVC pipe may be threaded.
      c. Use male adapters for plastic to metal connections. Hand tighten male adapters plus one turn with a strap wrench.

E. Interior copper wire, fittings, and connections:
   1. Interior water piping, fittings, and connectors: ASTM B88-99, Type "L" hard tempered copper tubing. Fitting shall be 150 pound working water pressure standard, solder end type, constructed of wrought copper, bronze or brass.
   2. Joints made with tin-lead solder, approximately 95-5 composition. Thoroughly polish joint and use proper flux to provide sound joints.

F. Materials list:
   1. Pop-up, gear-driven type sprinkler heads (Toro Series 670 – 750 for fairways and rough, Series 300 – 400 for green and tee box).
   2. Drip Emitters.
   3. Remote Hydraulic Control Valves.
   4. Valve Access Box.
   5. Flow Controls.
   6. Satellite Field Controllers (Type Vari-Time II Satellites, hydraulically controlled or approved equivalent).

G. Controls:
   1. Hydraulic Control.
   2. Controller protection boxes.

H. Electrical control wire:
   1. Electrical control and ground wire: Type UF 600 volt AWG control cable No. 14 or larger.
   2. Wire color code: Provide control or "hot" wires either black or red in color. Provide common or "ground" wire white in color.

2.03 ACCESSORIES

A. Drainage fill: 1/2" to 3/4" washed pea gravel.

B. Earth fill: Clean soil free of stone larger than 2" diameter, foreign matter, organic material and debris.
   1. Provide imported fill material as required to complete the work. Obtain rights and pay all costs for imported materials.
   2. Suitable excavated materials removed to accommodate the irrigation's system work may be used as fill materials subject to the Owner's Representative's review and acceptance.

C. Paint: Green, rust inhibitive paint.

D. Clamps: Stainless steel, worm gear hose clamps with stainless steel screws or ear-type clamps.

E. Low voltage wire connectors: Socket seal type wire connectors and waterproof sealer.

F. Valve access boxes: Tapered enclosure of rigid plastic material comprised of fibrous components chemically inert changes. Provide lid/of same material, green in color.

PART 3 - EXECUTION

3.01 PREPARATION

A. Layout and stake the location of pipe runs, sprinkler heads, and sprinkler valves. Obtain Owner's Representative acceptance of layout prior to excavation.

B. Place sleeves as indicated for installation of piping and control wire.

3.02 INSTALLATION:

A. Excavating and backfilling:
   1. Excavation shall be considered unclassified excavation and include all material encountered except materials that cannot be excavated by normal mechanical means.
   2. Excavate trenches of depth (12" maximum) and width to permit proper handling and installation of pipe and fittings. The excavation activities for installation of irrigation system shall not penetrate the cap.
   3. Fill to match adjacent grade elevations with approved earth fill material. Place and compact fill in maximum 8-inch deep layers.
      a. Provide approved earth fill or sand to a point 4" above the top of pipe.
      b. Fill to within 6-inch of final grade with approved excavated or borrow fill materials free of lumps or rocks larger than 3-inch in any dimension.
      c. Provide clean topsoil fill free of rocks and debris for top 6-inch of fill.
   4. Except as indicated, install irrigation mains with minimum 8" cover based on finished grades. Install irrigation laterals with minimum 8" cover based on finished grades.
   5. Excavate trenches and install piping and fill during the same working day. Do not leave open trenches or partially filled trenches open overnight.
   6. Replace paving with same materials, using joints and patterns to match existing adjoining paving surfaces.

B. Plastic pipe:
   1. Install plastic pipe in accordance with manufacturer's installation instructions. Provide for thermal expansion and contraction.
   2. Saw-cut plastic pipe using a square-end sawing vice to ensure a square cut. Remove burrs and shavings at cut ends prior to installation.
   3. Make plastic to plastic joints with solvent weld joints or slip seal joints. Use solvent recommended by the pipe manufacturer. Install plastic pipe fittings in accordance with pipe manufacturer's instructions.
   4. Make plastic to metal joints with plastic male adapters.

5. Allow joints to set at least 24 hours before pressure is applied to the system.

C. Sprinklers, Fittings, Valves, and accessories:

1. Install fittings, valves, sprinkler heads, risers, and accessories in accordance with manufacturer's instructions, except as otherwise indicated.
2. Provide concrete thrust blocks where required at fittings and valves.
3. Set sprinkler heads perpendicular to finished grades, except as otherwise indicated.
4. Provide pop-up spray heads with an adjustable double swing joint riser assembled with minimum three standard 90-degree ells. Fabricate double swing joint risers of schedule 80 PVC nipples and schedule 40 PVC elbows. Poly-pipe flex joints may be used on pop-up spray heads only.
5. Locate sprinkler heads for proper coverage of indicated areas. Do not exceed sprinkler head spacing distances indicated.
6. Install risers for spray heads in shrub or flowerbed areas and planters of height to prevent interruption of the stream by the plant material.
    a. Provide risers of 1/2" SDR 21 Class 200 PVC pipe with schedule 40 PVC male adapters or 1/2" Schedule 40 galvanized pipe, threaded each end.
    b. Paint exposed galvanized riser with one coat rust inhibitive paint and exposed plastic risers with one coat paint.
    c. Set risers in a row with top level and in-line.
7. Install pop-up gear driven sprinklers with an adjustable double swing joint riser of at least 3 standard 90-degree elbows. Fabricate double swing joint risers of schedule 80 PVC nipples and schedule 40 PVC elbows. The horizontal nipple connected directly into the side of the lateral line shall be minimum 3-inch long. All other nipples of the swing joint riser shall be of length required for proper installation of the sprinkler head. Furnish flexible joints that will not break and will allow movement if compressed by grass maintenance equipment.
    a. If the sprinkler heads have a side inlet, two street ells and a nipple may be used in lieu of a double swing joint assembly.
    b. Poly-pipe connectors may be used on pop-up sprays only.
8. Install quick-coupling valves with an adjustable double swing joint riser assembled by the use of at least three standard 90-degree elbows. Fabricate double swing joint risers of schedule 80 PVC nipples and schedule 40 PVC ells.
9. Install backflow prevention valve, fittings, and accessories required to complete the system.
10. Install in-ground control valves in a valve access box as indicated.
11. Install valve access boxes on a suitable base of gravel to provide a level foundation at proper grade and to provide drainage of the access box.
12. Seal threaded connections on pressure side of control valves with Teflon tape or approved plastic joint type compound.
13. Install drip emitters and distribution tubing where indicated. Provide all adapters, plugs, and fittings required.

D. Control Wiring:

1. Install electric control cable in the piping trenches where possible. Place wire in trench adjacent to pipe. Install wire with slack to allow for thermal expansion and contraction. Provide expansion joints in wire at 200 foot intervals by making five to six turns of the wire around a piece of 1/2" pipe instead of slack. Where necessary to run wire in a separate trench, provide minimum of 1'-0" cover.
2. Provide slack at wire connections at remote control valves in control boxes and at all wire splices to allow raising the valve bonnet or splice to the surface without disconnecting the wires when repair is required.
3. Connect each remote control valve to one station of a controller except as otherwise indicated.
4. Make wire connections to remote control electric valves and splices of wire in the field, using wire connectors and sealing cement in accordance with manufacturer's recommendations.
5. Provide tight joints to prevent leakage of water and corrosion build-up on joint.

E. Sleeves:

1. Provide new sleeves for all locations where existing sleeves are not indicated. Install new sleeves prior to paving installation where possible.

3.03 FLUSHING, TESTING, AND ADJUSTMENT

A. After sprinkler piping and risers are installed and before sprinkler heads are installed, open control valves and flush out the system with full head of water.

B. Perform system testing upon completion of each section. Make necessary repairs and retest repaired sections as required.

C. Adjust sprinklers after installation for proper and adequate distribution of the water over the coverage pattern. Adjust for the proper arc of coverage.

D. Tighten nozzles on spray type sprinklers after installation. Adjust sprinkler-adjusting screw on lateral line of circuit as required for proper radius. Interchange nozzle patterns as directed by the Owner's Representative to give best arc of coverage.

E. Adjust electric remote control valve flow control stems for system balance.

F. Test and demonstrate the controller by operating appropriate day, hour, and station selection features as required to automatically start and shut down irrigation cycles to accommodate plant requirements and weather conditions.

3.04 SPARE PARTS

A. Provide spare parts stock, delivered to location directed by Owner, as follows:

1. Two sprinkler heads of each size and type.
2. Two valves of each size.
3. Two valve access boxes.

4. Two keys for manual valves.
5. Two repair couplings for each size and type of pipe.

3.05 ACCEPTANCE

A. Test and demonstrate to the Owner's Representative and Owner operation of system free of leaks.

B. Instruct the Owner's designated personnel in the operation of the system, including adjustment of sprinklers, controllers, valves, pump controls, and moisture sensing controls.

C. Upon Date of Final Acceptance the Owner will assume operation of system.

3.06 CLEANING

A. Perform cleaning during installation of the Work and upon completion of the Work.

B. Stockpile, haul from site and legally dispose of waste materials, including unsuitable excavated materials, rock, trash, debris, and equipment.

C. Repair damage resulting from irrigation system installation.

END OF SECTION 02810

SECTION 02821

LANDSCAPING

PART 1 - GENERAL

1.01 DESCRIPTION: Provide all materials, labor, equipment, tools and services for the landscaping of green area, fairways, teeing area, rough area, and disturbed areas in accordance with the contract documents.

1.02 SECTION INCLUDED

A. The work in this section consists of the establishing of a stand of grass within the areas called for by placement of topsoil, sprigging/sodding, and mulching.

B. Landscaping under this section includes: sprigging complete with earth bed preparation; providing and placing topsoil; fertilizing topsoil; compacting and finishing topsoil; installing sprigs or sod, installing tree and shrubs as indicated on the drawings, mulching as required; protection of sprigged/sodded areas and landscaped areas; cleanup; watering; and maintaining the grassed and landscaped areas until the completion of the Work.

C. Related work not included in this section:
   1. Section 02200 – Earthwork
   2. Section 02270 – Sediment and Erosion Control

1.03 QUALITY ASSURANCE

A. Materials used in this work shall conform to the requirements of Mississippi Department of Transportation (MDOT) Standard Specifications of Roads and Bridges as follows:
   1. Mulch – Section 215
   2. Fertilizing – Section 213
   3. Water – Section 219

B. Plant names indicated; comply with "Standardized Plant Names" as adopted by the latest edition of the "American Joint Committee of Horticultural Nomenclature". Names of varieties not listed conform generally to names accepted by nursery trade. Provide stock true to botanical name and legibly tagged.

C. All plants shall be local nursery grown under climatic conditions similar to those in the locality of the project for a minimum of 2 years.

D. Stock furnished shall be at least the minimum size indicated. Larger stock is acceptable, at no additional cost, and providing that the larger plants will not be cut back to size indicated. Provide plants indicated by two measurements so that only a maximum of 25% are of the minimum size indicated and 75% are of the maximum size indicated.

E. Provide "specimen" plants with a special height, shape, or character of growth. Tag specimen trees or shrubs at the source of supply. The Engineer will inspect specimen selections at the source of supply for suitability and adaptability to selected location. When specimen plants cannot be purchased locally, provide sufficient photographs of the proposed specimen plants for approval.

F. Plants may be inspected and approved at the place of growth, for compliance with specification requirements for quality, size, and variety. Such approval shall not impair the right of inspection and rejection upon delivery at the site or during the progress of the work.

1.04 SUBMITTALS

A. Submit certifications and identification labels for all sprigging, sod, plants, and fertilizer supplied.

B. Submit for approval product data, mock-ups, test reports, warranty, maintenance data, 48-hour written notice prior to turnover to Owner for watering and maintenance.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver fertilizer materials in original, unopened, and undamaged containers showing weight, analysis, and name of manufacturer. Store in a manner to prevent wetting and deterioration.

B. Take all precautions customary in good trade practice in preparing plants for moving. Workmanship that fails to meet the highest standards will be rejected. Spray deciduous plants in foliage with an approved "Anti-Desiccant" immediately after digging to prevent dehydration. Dig, pack, transport, and handle plants with care to ensure protection against injury. Inspection certificates required by law shall accompany each shipment invoice or order to stock and on arrival; the certificate shall be filed with the Engineer. Protect all plants from drying out. If plants cannot be planted immediately upon delivery, properly protect them with soil, wet peat moss, or in a manner acceptable to the Engineer. Water heeled-in plantings daily. No plant shall be bound with rope or wire in a manner that could damage or break the branches.

C. Cover plants transported on open vehicles with a protective covering to prevent windburn.

D. Provide dry, loose topsoil for planting bed mixes. Frozen or muddy topsoil is not acceptable.

1.06 PROJECT CONDITIONS

A. Work notifications: Notify Engineer at least 7 working days prior to installation of plant material.

B. Protect existing utilities, paving, and other facilities from damage caused by landscaping operations.

1.07 WARRANTY

A. Warrant plant material to remain alive and be in healthy, vigorous condition for a period of 1 year after completion and acceptance of each contract item as listed in bid package. Inspection of plants will be made by the Engineer at completion of planting.

B. Replace, in accordance with the Drawings and Specifications, all plants that are dead or, as determined by the Engineer, are in an unhealthy or unsightly condition, and have lost their natural shape due to dead branches, or other causes due to the Contractor's negligence. The cost of such replacement(s) is at the Contractor's expense. Warrant all replacement plants for 1 year after installation.

C. Warranty shall not include damage or loss of trees, plants, or ground cover caused by fires, floods, freezing rains, lightning storms, or winds over 75 miles per hour, winter kill caused by extreme cold and severe winter conditions not typical of planting area; acts of vandalism or negligence on the part of the Owner.

D. Remove and immediately replace all plants, as determined by the Engineer to be unsatisfactory during the initial planting installation.

PART 2 - PRODUCT

2.01 MATERIALS

A. Plants: Provide plants typical of their species or variety' with normal, densely-developed branches and vigorous, fibrous root systems acclimated to growth in this region (locally grown plants at a nursery within 100 miles of the Keesler Landfill Site). Provide only sound, healthy, vigorous plants free from defects, disfiguring knots, sunscald injuries, frost cracks, abrasions of the bark, plant diseases, insect eggs, borers, and all forms of infestation. All plants shall have a fully developed form without voids and open spaces. Plants held in storage will be rejected if they show signs of growth during storage.

1. Dig balled and burlapped plants with firm natural balls of earth of sufficient diameter and depth to encompass the fibrous and feeding root system necessary for full recovery of the plant. Provide ball sizes complying with the latest edition of the "American Standard for Nursery Stock". Cracked or mushroomed balls are not acceptable.
2. Container-grown stock: Grown in a container for sufficient length of time for the root system to have developed to hold its soil together, firm, and whole.
    a. No plants shall be loose in the container.
    b. Container stock shall not be pot bound.
3. Plants planted in rows shall be matched in form.
4. Plants larger than those specified in the plant list may be used when acceptable to the Engineer. If the use of larger plants is acceptable, increase the spread of roots or root ball in proportion to the size of the plant.
5. Shrubs and small plants shall meet the requirements for spread and height indicated in the plant list.

a. The measurement for height shall be taken from the ground level to the height of the top of the plant and not the longest branch.

b. Single stemmed or thin plants will not be accepted.

c. Side branches shall be generous, well-twigged, and the plant as a whole well-bushed to the ground.

d. Plants shall be in a moist, vigorous condition, free from dead wood, bruises, or other root or branch injuries.

B. Sprigs/Sod

1. Sod/Sprigs shall be of Certified Type 419 Bermuda for fairways, teeing area, rough area, and disturbed areas; and Certified Type Tif Dwarf for the green area.

2. All sod/sprigs shall be certified Tifway 419 Bermuda grass sprigs and will guarantee that the sprigs are free from any common bermudagrass. Sod/sprigs shall be healthy and viable and must be maintained in that state until planted.

C. Mulch

1. The mulch material used shall normally be dry mulch. Dry mulch shall be straw or hay, consisting of oat, rye, or wheat straw, or of pangola, peanut, coastal Bermuda or bahia grass hay.

2. Only undeteriorated mulch which can readily be cut into the soil shall be used.

3. Mulch shall comply with MDOT Section 215.

D. Fertilizing

1. Chemical fertilizer shall be supplied in suitable bags with the net weight of the contents and guaranteed analysis shown on the container.

2. Bulk shipments shall be accompanied by an analysis and net weight certification of the shipment.

3. Dolomitic limestone shall be a product designated for agricultural use.

4. Fertilizer and limestone shall comply with MDOT Section 213.

E. Water: The water used in grassing operations shall conform to MDOT Section 219, and may be obtained from the on-site water supply.

F. Topsoil

1. Topsoil shall be imported from an off-site source approved by the Owner, and shall be free of contamination.

2. Topsoil material shall be suitable for plant growth and free from appreciable quantities of hard clods, stiff clay, hardpan, gravel, brush, large roots, refuse or other deleterious materials, and of reasonably uniform quality.

3. Topsoil shall conform to the requirements of United States Golf Association (USGA) Specifications.

G. Fertilizer

1. Plant Fertilizer: Commercial type approved by the Engineer, containing 12% nitrogen, 14% phosphoric acid, and 8% potash by weight. One quarter of nitrogen in the form of nitrates, one quarter in the form of ammonia salt, and one half in the form of organic nitrogen.

H. Anti-Desiccant:

1. Protective film emulsion providing a protective film over plant surfaces; permeable to permit transpiration. Mixed and applied in accordance with manufacture's instructions.

I. Equipment

1. The device for spreading fertilizer and dolomitic limestone shall be capable of uniformly distributing the material at the specified rate.
2. The mulching equipment shall be of a type capable of cutting the specified materials uniformly into the soil and to the required depth. Harrows will not be allowed.
3. A cultipacker, traffic roller, or other suitable equipment will be required for rolling the grassed areas.

PART 3 - EXECUTION

3.01 SPREADING OF TOPSOIL

A. The Contractor shall place a minimum of 6-inches of topsoil over the fill soil placed over the landfill. The Contractor shall spread the topsoil loosely over the compacted fill soil layer using a rubber-tired tractor with grader blade or approved equivalent.

3.02 FERTILIZING

A. Fertilizing shall be in accordance with MDOT Section 213.

3.03 INSPECTION

A. The Owner's Representative will verify that soil preparation and related preceding has been completed.

B. The Contractor shall not start work until conditions are satisfactory and soil preparation has been approved by the Owner's Representative.

3.04 SPRIG INSTALLATION

A. The machine(s) to be used to plant the sprigs must complete the process in one pass over each area. The machine(s) must open a slit, deposit the sprigs 2 inches apart in rows 4 inches apart, close the slit and roll the sprigs down. A minimum of 600 bushels of sprigs per acre will be planted. The entire planting process must be completed in 3 days or less. Broadcasting of sprigs is not an acceptable option and must not be used. This process will cause only minimal disruption to the fairway surface.

B. After a 12-week warranty growth period the golf course will be responsible for post planting care, which includes watering, fertilization, and weed control.

C. Coordinate with the golf course Superintendent and Director of Golf prior to any commencement of work and must meet daily with both individuals during the planting process. Be responsible for any damage done inadvertently to the course and repair any such damage without charge. The golf course will not be responsible for any accident to the Contractor's employees or damage to their equipment while they are on the golf course premises.

3.05 SHRUB AND TREE INSTALLATION

A. Examine proposed planting areas and conditions of installation. Do not start planting work until unsatisfactory conditions are corrected.

B. Planting shall be performed only by experienced workmen familiar with planting procedures under the supervision of a qualified supervisor.

C. Locate plants as indicated or as approved in the field after staking by the Contractor. If obstructions are encountered that are not shown on the Drawings, do not proceed with planting operations until alternate plant locations have been selected.

D. Excavate circular plant pits with vertical sides, except for plants specifically indicated to be planted in beds. Provide shrub pits at least 12" greater than the diameter of the root system and 24" greater for trees. Depth of pit shall accommodate the root system, but in no case penetrate the landfill GCL layer. Provide undisturbed tamped down topsoil to hold root ball at nursery grade as shown on the drawings.

E. Provide pre-mixed planting mixture for use around the balls and roots of the plants consisting of planting topsoil and ½ lb. Plant fertilizer for each cu. yd. of mixture.

F. Set plant material in the planting pit to proper grade and alignment. Set plants upright, plumb, and faced to give the best appearance or relationship to each other. Set plant material 2" – 3" above the finished grade. No filling will be permitted around trunks or stems. Backfill the pit with planting mixture. Do not use frozen or muddy mixtures for backfilling. Form a ring of soil around the edge of each planting pit to retain water.

G. After balled and burlapped plants are set, muddle planting soil mixture around bases of balls and fill all voids. Remove all burlap, ropes, and wires from top of balls of trees and remove entirely from all other plant material.

3.06 MAINTENANCE

A. Maintain plantings until completion and acceptance of the entire project.

B. Maintenance shall include pruning, cultivating, weeding, watering, and application of appropriate insecticides and fungicides necessary to maintain plants free of insects and disease.

1. Re-set settled plants to proper grade and position. Restore planting saucer and adjacent material and remove dead material.
2. Tighten and repair guy wires and stakes as required.
3. Correct defective work as soon as possible after deficiencies become apparent and weather and season permits.
4. Water trees, plants, and ground cover within the first 24 hours of initial planting, and not less than twice per week until final acceptance.

3.07 ACCEPTANCE

A. Inspection to determine acceptance of planted areas will be made by the Owner's Representative, upon the Contractor's request. Provide notification at least 10 working days before requested inspection date.
   1. Planted areas will be accepted provided all requirements, including maintenance, have been complied with and plant materials are alive an in a healthy, vigorous condition.

B. Upon final acceptance, the golf course Superintendent will assume plant maintenance.

3.08 CLEANING

A. The Contractor shall remove debris and excess materials from the Site.

END OF SECTION 02821

DIVISION 3

CONCRETE

SECTION 03310

FORMS, CONCRETE AND REINFORCEMENT

PART 1 – GENERAL

1.01 SECTIONS INCLUDED

A. Contractor shall furnish all labor, materials, equipment and incidentals needed to provide formwork, reinforcement, and concrete including all concrete joints, grout and incidentals required to complete the Work as shown and specified.

B. Related Work Specified in Other Sections:
   1. Section 02200 – Earthwork
   2. Section 02221 – Trench Excavation and Backfill
   3. Section 02720 – Storm Drains

1.02 QUALITY ASSURANCE AND REFERENCE SPECIFICATIONS

A. ACI 301-96, Standard Specification for Structural Concrete.

B. ACI 305R-91, Hot Weather Concreting.

C. ACI 306R-90, Cold Weather Concreting.

D. ACI 318 Building Code Requirements for Reinforced Concrete.

E. ACI 347, Recommended Practice for Concrete Formulas.

F. ASTM A-615-94, Standard Specification for Deformed and Plain Billet-Steel Bars for G. Concrete Reinforcement.

H. AASHTO M 55, M 221, Standard Specification for Steel Wire Fabric.

I. ASTM C-33-92, Standard Specification for Concrete Aggregates.

J. ASTM C-94-94, Standard Specification for Ready-Mixed Concrete.

K. ASTM C-150-92, Standard Specification for Portland Cement.

L. ASTM C-260-94, Standard Specification for Air-Entraining Admixtures for Concrete.

M. ASTM C-494-92, Standard Specification for Chemical Admixture for Concrete.

N. ASTM C 1107-91 (Rev. A) Packaged dry, Hydraulic-Cement Grout (Non-Shrink).

O. ASTM C 1752, Joint Fillers

P. An Independent Testing Laboratory (ITL) shall be engaged by the Contractor, and shall be used to inspect and test all materials. The Contractor shall bear the cost and re-testing and re-inspecting all work not conforming to the requirements established in the Specifications and Drawings. Reporting requirements are defined in SECTION 01300-SUBMITTALS and SECTION 01410-TESTING LABORATORY SERVICES.

1.03 SUBMITTALS

A. The Contractor shall provide submittals in accordance with requirements of SECTION 01300 – SUBMITTALS. In addition, the Contractor shall submit the following to Owner for approval:
   1. Submit mix design for approval.
   2. Submit complete and detailed shop drawings showing locations, sizes, positions, bending details and schedules of all reinforcement and embedments for approval prior to fabrication.
   3. Manufacturers certificates for admixtures.
   4. Certified copies of tests for concrete air content, slump, and cylinder break strengths.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Portland Cement: ASTM C-33; Type I or Type II.

B. Aggregates: ASTM C-33.
   1. Fine Aggregates: Natural sand or sand prepared from stone.
   2. Coarse Aggregates: Crushed, stone or gravel.

C. Water: Clean and free from injurious amounts of oil, alkali, organic matter, or other deleterious material.

D. Forms: Contractor's choice of materials or grade or type suitable to obtain specified finish.

E. Air Entrainment: ASTM C-260.

F. Water-Reducing, Set-Controlling Admixtures: ASTM C-494, Type A, Type D, Type F or Type G. Add water-reducing admixtures at the mixer separately from air-entraining admixtures in accordance with manufacturer's printed instructions.

G. Non-shrink Grout: ASTM C-1107.

H. Joint Filler: Where indicated on the drawings joints shall be filled with a pre-formed, non-extruding, resilient nonbituminous type of joint filler, complying with ASTM Designation D1752.

I. Joint Sealer: Shall be two-part polysulfide caulking compound. Shall be Tremco Manufacturing Company "Lasto-Meric"; Sonneborn-DeSoto "Sonnlastic", A.C. Horn "Hornflex", or Precorra "GC-5 (Thiokol Polymer)".

J. Pre-formed Control Joint: Shall be manufactured by Vinylex Corp., Schegel Corp., Vulcan Corp., or approved equal.

K. Curing compound shall conform to ASTM C-309.

2.02 REINFORCEMENT MATERIALS

A. Reinforcing Steel: ASTM A-615, 60 psi yield strength; deformed billet steel bars; plain finish.

B. Tie Wire: Minimum 16 gage annealed type.

2.03 CONCRETE MIX

A. Ready-mix concrete shall be used in accordance with ASTM C-94.

B. Mix and proportion to produce minimum 4000-psi concrete at 28 d with 5% +/- 1% air entrainment. ASTM C-94. Maximum slump shall be 3 in. except for a maximum of 6 in. where Type F or G water-reducing admixture is used. Maximum water-cement ratio shall be 0.5 to 1.0.

C. Use accelerating admixture in cold weather only when approved by the Owner's Representative. Use of admixtures shall not relax cold-weather placement requirements. Calcium chloride shall not be used.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Examine the subgrade to verify that rough grading elevations match foundation elevations shown.

3.02 INSTALLATION

A. Subgrade Preparation: Prepare subgrade in accordance with SECTION 02200 – EARTHWORK.

B. Forming
   1. Shall comply with ACI 301, Chapter 4 Formula.
   2. Forms: Shall be free from warp, tight enough to prevent leakage of mortar, and substantial enough to maintain their shape and position without springing or settlement when concrete is placed or vibrated.
   3. Forms shall be clean and free of oil or grease.

C. Placing and Mixing Concrete

1. Contractor shall deposit concrete in accordance with ACI 301, Chapter B. Deposit concrete in approximately horizontal layers.
2. Spade concrete thoroughly along forms and joints, and work carefully into corners and around reinforcement. Vibrate concrete as specified in ACI 301 but in no case shall vibrators be used to transport concrete inside the forms.
3. Mixing shall comply with ACI 30, Article 7.1.1 Equipment and methods shall conform sot ASTM C-94, Alternate No. 2.
4. Do not mix or place concrete when air temperature is below freezing or when the temperature may be expected to fall below 40oF within 24-hours after concrete is placed.
5. Time in Transit: Maximum 90-minutes between loading concrete on truck and placing in final position.
6. Weather Conditions: In addition to ACI 301, comply with the following:
   a. Cold Weather: ACI 306.
   b. Hot Weather: ACI 305.

D. Finishing: Walls and other formed surfaces shall be given a Plywood Finish as defined in ACI 301. Honeycombs or other defective surfaces shall be patched as required to present a clean, smooth surface.

E. Curing Concrete: Curing and protection of all concrete shall be done in strictest conformance with the requirements set forth in ACI 301, Chapter 11. The minimum curing period shall be 7-days. Combine curing and sealing polymers is permitted.

3.03 FIELD QUALITY CONTROL

A. The Contractor will retain an independent testing laboratory to perform the concrete testing, and pay the cost of shipping and testing. The Contractor shall provide all equipment and labor for obtaining samples and shall cooperate with the independent testing laboratory representative to facilitate the taking of samples.

B. Sample and test concrete the first truck for slump and percentage air. Obtain this information for each additional 50 cubic yards of concrete placed with a minimum of one sample each day.

C. Make three compression test cylinders from concrete from each truck that has been accepted for slump and air content. Carefully maintain on-site for the first 24-hours and then transport to the laboratory for curing. Test one cylinder from each set at 7-day for information and one at 28-days for acceptance. Hold the third cylinder in reserve and test only at the direction of the Owner's Representative.

D. The Owner's Representative may request additional tests or cylinders to be taken at anytime during placement.

END OF SECTION 03310